Spring 5-21-1954

A Comparative Study of Two Methods of Teaching Instrumental Music Classes

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A COMPARATIVE STUDY OF TWO METHODS OF TEACHING INSTRUMENTAL MUSIC CLASSES

by

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B.Mus.Ed., University of Colorado, 1952

B.Mus., University of Colorado, 1952

A Thesis submitted to the Faculty of the Graduate School of the University of Colorado in partial fulfillment of the requirements for the Degree

Master of Music Education

College of Music

1954

This Thesis for the M.Mus.Ed. degree by

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Music

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Date May 21, 1954

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A Comparative Study of Two Methods of Teaching Instrumental Music Classes

Thesis directed by Assistant Professor Wesley E. Smith

This study was an outgrowth of a recognized need for research in classroom teaching of music. It was the purpose of the writer to teach two comparable classes in instrumental music, each class to be taught according to a different teaching method, and to compare the relative effectiveness of the two methods. The classes were composed of twenty children each, in the age group nine through eleven. The two groups were equated according to socio-economic backgrounds, musical backgrounds, intelligence, and school achievement.

One teaching method was based on association learning theory, the other on field psychology or Gestalt theory. The principle in the former was to stamp in correct habits through repetition in the presence of reward or need reduction; the principle in the latter was to present problems in class for solution by the class members.

Measurement was accomplished through objective tests and subjective evaluation. From the results of the measurements, conclusions were drawn that the cognitive processes of understanding seem to have much to do with efficiency of learning and retention in the learning of

performance on musical instruments. The further conclusion was drawn that better results in performance of instrumental classes may be expected if greater responsibility for musical performance is placed on the players, rather than on a teacher who imposes his ideas on the group.

This abstract of about 225 words is approved as to form and content. I recommend its publication.

Signed Wesley E. Smith
Instructor in charge of dissertation

ACKNOWLEDGMENTS

The writer wishes to express his appreciation to L. Randall Spicer, Director of the Boulder Summer Recreational Music Program for 1953, for his co-operation in allowing the investigation to be carried out within the summer program; and to Superintendent Natt B. Burbank and the staff of the Boulder Public Schools for enabling the writer to have access to the cumulative record files of the children in the study.

Special thanks are given to John E. Stowe, who served as assistant in the investigation, and to Roman Tross, who served as an independent adjudicator in the measurement program. The writer also expresses gratitude to Dr. Harold M. Anderson and Leo W. O'Neill for assistance in statistical analysis of scores obtained in the investigation.

TABLE OF CONTENTS

CHAPTER		PAGE
I.	THE PROBLEM AND THE NEED FOR THE STUDY . . .	1
	The problem	1
	Statement of the problem	1
	Purpose of the study	1
	Limitations of purpose in the study . .	2
	The need for the study	4
	Definitions of terms used	12
	Learning	12
	Teaching method	12
	Organization of remainder of thesis . . .	13
II.	THE TEACHING METHODS	14
	Learning theories	14
	Early forms of learning theory	14
	Thorndike's connectionism	15
	Behaviorism and conditioning	17
	Hullian theory	17
	Gestalt psychology	19
	Lewinian theory	21
	Association psychology and field psychology contrasted	22
	Description of the two teaching methods .	23
	Pedagogy of Method I	24
	Pedagogy of Method II	26

CHAPTER PAGE

III. THE STUDY 29

Preliminary preparations 29

The materials 32

Selection of subjects and grouping into classes 34

Physical facilities 39

Evaluation and measurement 42

The subjective observation program . . . 43

The objective measurement program 46

Records kept in the study 52

Examples of class procedure 53

Intonation 53

Tone 55

Note and rest values 56

Interpretation 56

IV. THE RESULTS OF THE STUDY 58

Basis for comparing the groups 58

Results of the subjective observation . . . 60

Daily observation 60

Results of the final adjudication 64

Results of the objective tests 69

V. SUMMARY AND CONCLUSIONS 85

Summary of the study 85

Conclusions and recommendations 90

BIBLIOGRAPHY 98

CHAPTER PAGE

APPENDIX A. Preliminary Survey: A Selected Representative List 102

APPENDIX B. Letters of Permission 104

APPENDIX C. Personal Information Questionnaire . . . 106

APPENDIX D. Examples Used in the Objective Tests . . 107

APPENDIX E. Attendance Records 108

APPENDIX F. Excerpts from the Diaries Kept for the Two classes 110

LIST OF TABLES

TABLE		PAGE
I.	Ratings Given on Final Adjudication	65
II.	Individual Scores Made on Objective Tests . .	70

LIST OF FIGURES

FIGURE PAGE

1. Diagram of the Choir Room, Boulder High School 40
2. Seating Arrangement of the Classes 41

CHAPTER I

THE PROBLEM AND THE NEED FOR THE STUDY

Approximately a quarter of a century ago the idea of teaching instrumental music within the public school in classes, using group instrucional methods, gained widespread interest among American teachers. Since that time the practice of class instruction in instrumental performance has won general acceptance in American schools and has become a regular part of the curriculum in a great number of them.

THE PROBLEM

Statement of the problem. This investigation dealt with a study of the learning, through class instruction, of performance on various wind and percussion instruments by children living in Boulder, Colorado. More particularly, it was designed to reveal the comparative effectiveness of two methods or procedures of teaching which were derived from describably different theories of learning.

Purpose of the study. It was the purpose of this study to ascertain which of two comparable groups of children, taught respectively according to the two teaching

methods mentioned above, showed evidence through observed performance, individually and in instrumental ensemble, of having learned the prescribed material with the greatest efficiency during the time in which the study was conducted. The environment of the two classes was to resemble, as nearly as possible, a typical classroom situation in which public school instrumental groups might actually be taught.

Many modern psychologists incline toward the view that none of the major learning theories thus far advanced satisfactorily accounts for all observable aspects of learning, and that there may therefore be two or more different kinds of learning, each perhaps with its own operant laws.[1] On the basis of this premise it was decided that the purpose of the study should not be simply to rule one procedure superior to the other, but to allow for the possibility that one method might prove more effective in certain learning activities than the other and less effective in other activities. Any observed indications of such learning phenomena were to be included in the report of the investigation.

Limitations of purpose in the study. The purpose of the study was confined to educational procedure. It

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[1] Ernest R. Hilgard, Theories of Learning (New York: Appleton-Century-Crofts, Inc., 1948), pp. 325-31.

was not undertaken in order that the results might be used in support of one psychological theory or another. It was undertaken solely for the purpose of advancing present knowledge concerning effective classroom instrumental music teaching. Learning theory was used merely as a likely starting point, offering the most usable organization of past observations of learning.

Although the carrying out of the study made use of the scientific method, it was not limited to the scientific method. For this reason it was not considered to be a psychological or sociological laboratory experiment. The scientific method of investigation was employed in the general design of the study because of the proven value of organizing investigation scientifically. The rigid controls, narrow limits of investigation, and entirely objective measurements of scientific method were, however, incompatible at several points with the aims of the study and with the ordinary classroom atmosphere in which the study was conducted. For example, certain factors important to the evaluation of musical performance, such as tone quality and musical phrasing, are not subject to objective measurement in the scientific sense. Again, the desirability of the closest possible approximation to an actual classroom situation ruled out the imposition of such rigid controls as are necessary in a clinical experiment. Likewise, the scope of the investigation, covering all facets of performance that could be readily

observed, went beyond the narrow limits of classical experimental method.

The final aim of the study was merely to take a step in the right direction, within the limits heretofore described, toward a threefold objective which may be stated as follows:

1. Discovery of those teaching methods that are most successful in instrumental classes.

2. Discovery of the direction which music educators should take in evolving teaching method.

3. Indication of areas in which future experiment may be most fruitful.

THE NEED FOR THE STUDY

An extensive (though by no means exhaustive) survey[2] which the writer made of the literature of music education in general and class instrumental instruction in particular, revealed that most of the writers who advance methods, procedures, and devices for teaching classes of children to play, sing, or appreciate music draw chiefly upon personal teaching experience for the methods which they advocate. For the most part their systems are based on what is popularly called trial and error experimentation

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[2] The survey consisted of an examination of books, periodicals, publications of learned organizations, encyclopedia articles, and descriptive bibliographies available to the writer. A selected list of works included in the survey will be found in Appendix A., p. 102.

or attempts to classify the various materials of music education into an orderly and logical system. Typical is the following statement taken from the Preface of L. Bruce Jones's Building the Instrumental Music Department:

> The materials in this work have come from three sources: (1) extensive reading of books and periodicals; (2) study with leaders in the field; and (3) work in the practical laboratory, where much trial and error with the pupils in actual learning situations has tested, proved, and improved procedures.[3]

Much has been said and written on the basis of personal teaching experience concerning effective methods for classroom instrumental teaching. Comparatively little, on the other hand, has been written in an effort to apply the findings of learning psychology to class instrumental instruction or to report results of testing various hypotheses of learning theories in the classroom.

Of the writings surveyed which did take into account learning theory in some form, several will be briefly reviewed here.

Seashore, in his book The Psychology of Music,[4] devotes a chapter to the application of learning psychology in practical performance of music. Rather than present an account of learning theory and its applicability to musical learning, he confines his discussion to the presentation of

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[3] Llewellyn Bruce Jones, Building the Instrumental Music Department (New York: Carl Fischer, 1949), p. iii.

[4] Carl E. Seashore, The Psychology of Music (New York: McGraw Hill Book Company, Inc., 1938), 408 pp.

twelve rules, derived by himself from learning theory, which he advises the student to follow. While Seashore does not commit himself to acceptance of any specific theory, certain of his twelve rules, e.g., "Practice only by recall," and, "Build each new acquisition into a habit,"[5] imply that his preference would be for some form of associationism.[6]

James L. Mursell is a music educator who has long been concerned with the importance of psychology as applied to the teaching of music. As far back as 1930, Mursell recognized the significance for music education of then recent experimental findings of German psychologists. Mursell's writings prior to 1930[7] show an acceptance, as was then common in this country, of the habit channel theories advanced by William James and modified by Thorndike.

In an address[8] delivered to the assembled Music Supervisors National Conference in March, 1930, at

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[5] Ibid., pp. 150-56.

[6] For a brief resume of associationism and other psychological references in this chapter, see Chapter II.

[7] e.g., James L. Mursell, Principles of Musical Education (New York: The Macmillan Co., 1927), pp. 65-66.

[8] James L. Mursell, "Some Fundamental Principles of Musical Instruction," Journal of Proceedings of the Music Supervisors National Conference, Twenty-third year, 1930 (Ithaca, New York: Music Supervisors National Conference, 1930), pp. 99-105.

Chicago, Mursell advocated a re-examination of prevalent pedagogical methods in music in the light of research by the early Gestalt psychologists. In his book The Psychology of School Music Teaching,[9] written in collaboration with Mabelle Glenn, which was published a few years later, Mursell continued his appeal for an application of Gestalt principles to educational procedure. Mursell was, however, more sweeping in his judgment than were many of his contemporaries. He dismissed as "fiction" certain principles formulated by the connectionist school of psychologists on the basis of years of carefully conducted experiments.[10] Mursell's conclusions regarding learning theory are drawn from experimentation dealing with learning in fields other than music itself.[11]

In his later Educational Psychology[12] Mursell mediates his position to the extent of voicing a belief that all theories are equally valuable in increasing knowledge of the learning process, and that an integration

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[9] James L. Mursell and Mabelle Glenn, The Psychology of School Music Teaching (New York: Silver, Burdett and Co., 1936), 371 pp.

[10] Ibid., p. 46.

[11] Ibid., pp. 43-69.

[12] James L. Mursell, Educational Psychology (New York: W. W. Norton and Co., Inc., 1939), 318 pp.

of several theories is needed.[13] However, his discussion of conditions for effective learning stresses "meaningfulness" and "whole" learning in preference to "part" learning.[14] This viewpoint is still more favorable to field or Gestalt theory than to association theory.

More recently Neal E. Glenn[15] has written of the application of psychology to music teaching. Glenn's position is that neither the connectionist theories nor the cognitive theories need be accepted in entirety, but that significant learning principles may be drawn from both schools.[16] This middle ground position is similar to that of many modern psychologists who are not extreme partisans to one theoretical concept or another.[17] Glenn offers probably the most thorough discussion of the various aspects of learning that have been investigated and their application to the typical problems of music teaching. In his attempt to reconcile opposing theories of learning, however, Glenn has failed to apply the theories so that they supplement one another, each emphasized where its own point of view most strongly supports the empirical facts,

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[13] Ibid., pp. 157-66.

[14] Ibid., pp. 188-96.

[15] Neal E. Glenn, Teaching Music in Our Schools (Dubuque, Iowa: Wm. C. Brown Company, 1951), 141 pp.

[16] Ibid., p. 34.

[17] See page 2.

but has instead employed all theories to describe learning in its general phases, where the theories are most in conflict. Glenn's summary conclusions appear to be tilted in favor of association theory: "The fundamental principles of learning music are maturation, trial and error learning, motivation, and conditioning."[18]

Again, as in the writings of Seashore and Mursell, the investigations upon which Glenn bases his conclusions are experiments dealing with general learning, not with musical learning specifically. It is indicative of Glenn's point of view that he states: "The general principles concerning the teaching of music . . . are the same as the teaching of all subjects."[19]

Concerning the research in music education proper, Hendrickson and Stratemeyer[20] state that most research done has been in the field of measuring aptitude and talent, and in determination of validity and reliability of the measurements. They make the further observation:

> Comparatively few investigations have made a direct attack upon instructional problems in the classroom. Many teachers have resisted the scientific approach to their subject, and research can at present be regarded as adequate on few if any of the major issues

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18 Glenn, op. cit., p. 46.

19 Ibid., p. 35.

20 Gordon Hendrickson and Clara G. Stratemeyer, "Music Education," Encyclopedia of Educational Research, 1950, pp. 763-64.

in music education.[21]

Cited in the same article are studies made by Jenson and Hendrickson to determine areas and problems in music educational research. They include among the ten most needed fields of study "Relationships between musical education and social psychology; cultural anthropology; and educational sociology."[22]

Hendrickson and Stratemeyer's article carries the review of research to January, 1948. An examination of the issues of the Review of Educational Research[23] published since that date failed to reveal any new studies in the area in question. Walter S. Freeman[24] states, however, that he has observed a trend in music education research toward curriculum organization, history, measurement, and the psychology of music.

An examination of the first volume of the recently inaugurated Journal of Research in Music Education[25] also failed to reveal new studies bearing on the present investigation.

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[21] Ibid., p. 771.

[22] Loc. cit.

[23] American Educational Research Association, Review of Educational Research (Washington, D. C.: National Education Association of the United States), Vols. 18-23.

[24] Walter S. Freeman, "Music Education," Review of Educational Research, 22:136-40, April, 1952.

[25] Journal of Research in Music Education (Chicago: Music Educators National Conference, 1953), Vol. I.

Such an outstanding psychologist as Ernest R. Hilgard[26] has recognized the need for more emphasis in research on the application of scientific principles to practical situations:

> There is one faulty interpretation of the relationship between pure and applied science which is to be avoided. This is the interpretation that applications, if they are to have any verifiable basis, must wait until there is a pure science ready to be applied. . . . . it is quite possible to do applied research before the problems of pure science are settled, and it is seldom if ever possible to apply scientific principles directly to practical situations without some empirical tailoring to make them fit.
>
> . . . . . .
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> An adequate research program in the applied psychology of learning would rest in part upon the findings in the experimental studies of learning, but it would consist in much more than the making of suggestions on the basis of general principles. There must finally be experimental testing in the school, or on the playground, or in the shop--wherever the application is to be made.[27]

Hilgard further observes, "A principle once discovered in a better controlled situation can be validated in a less well-controlled one."[28]

It is clear, in the light of the preceding citations, that there is a recognized need for experimentation in a scientific spirit in real classroom situations to determine

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[26] Ernest R. Hilgard, executive head of Department of Psychology, Stanford University; President, American Psychological Association, 1948-49.

[27] Ernest R. Hilgard, Theories of Learning (New York: Appleton-Century-Crofts, Inc., 1948), pp. 357-58.

[28] Ibid., p. 358.

the methods that are actually most efficient in teaching music to children, and to investigate the real value, in practical applications, of psychological learning theories.

DEFINITIONS OF TERMS USED

Learning. Learning was interpreted throughout the study as meaning the process by which an activity of the learner is originated or changed through training, as distinguished from changes caused by factors other than training, such as maturation, fatigue, or drugs. Learning was in all cases to be inferred from the origination of activity in performance or changes therein, but was not considered identifiable with performance.[29]

Teaching Method. A teaching method was interpreted throughout the study as meaning a co-ordinated system of experiences and activities arranged by the teacher for the purpose of enabling the children in a class to learn. Only those experiences and activities that were directed toward the learning of the prescribed material to be studied in the class were considered part of the teaching method. Each experience or activity included was required to be in consistence with a central basis or hypothesis on which the system of experiences and activities was founded

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[29] Adapted from Hilgard, op. cit., pp. 4-5.

ORGANIZATION OF REMAINDER OF THESIS

Chapter II of the thesis will deal with the formulation of the two teaching methods employed in the investigation. In order that the dependence of each teaching method on a learning theory may be more clearly understood, a section giving a brief account of the development of learning psychology will precede the definitive description of the two teaching methods.

Chapter III will be concerned with reporting the investigation as it was carried out. The conditions under which the study went forward, sources of data, and a description of the program of measurement and evaluation will be detailed.

Chapter IV will report the results of the investigation in terms of the measurement and evaluation criteria defined in Chapter III.

In Chapter V a brief summary of the study, reviewing the major points of the investigation recounted in the earlier chapters, will be followed by conclusions based on the writer's interpretation of the results obtained in the study, and suggestions for further investigation.

CHAPTER II

THE TEACHING METHODS

The pedagogies of the teaching methods which were used in the study were based on a minimum set of theoretical propositions drawn from a survey of the literature and practice of association and field or Gestalt psychologies in the learning area. For the reader who may be unfamiliar with the basic tenets of these schools, a brief history of the theories as they evolved will be given below.

LEARNING THEORIES

Early forms of learning theory. Shortly after Wilhelm Wundt officially launched psychology as a science of consciousness at Leipzig in 1879, the German philosopher Ebbinghaus independently began experimental research on memory, focusing his attention on behavior rather than on consciousness. This experimentation was the beginning of scientific attack on the learning process.

Early theoretical speculation centered on recall of memorized material and the phenomena of habit formation. The American psychologist William James hypothesized that habit consisted of neural pathways through the nervous

system, deepening with every repetition of the specific muscular response. It remained for James's pupil, Edward L. Thorndike, to order the known facts of learning into the first systematized theory of learning, which was first announced in 1898.[1]

Thorndike's connectionism. The basis for learning put forward by Thorndike in his early theory was the association between sensory impressions and action impulses. These associations, which came to be called "bonds" or "connections," supposedly became either strengthened or weakened, according to certain circumstances, resulting in the making or breaking of habits. In a carefully controlled series of experiments with cats as subjects, Thorndike found what he considered to be evidence that the most characteristic form of learning was trial-and-error learning, or learning by selecting and connecting appropriate responses by "bond" association. Thorndike postulated three major "laws" of learning, of which the third, the law of effect, brought motivation forward for the first time as a central part of the learning process. These laws may be briefly summarized as follows:

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[1] O. Hobart Mowrer, "Learning Theory," Review of Educational Research, 22:478-79, December, 1952.

1. The law of readiness. When a conduction unit[2] is ready to conduct, conduction is satisfying to the organism and non-conduction is annoying. Forced conduction is annoying if a conduction unit is unready for conduction.

2. The law of exercise. Frequent and continued use tends to strengthen a connection; disuse tends to weaken and eventually to eliminate it.

3. The law of effect. When a modifiable connection is made and is accompanied or followed by a satisfying state of affairs, the strength of connection is increased; if the accompanying or following state of affairs is annoying, the connection strength is weakened.

In his writings after 1930, Thorndike revised his "laws" of learning in the light of more recent experimentation. He discarded almost completely his law of exercise. The law of effect remained only in one half, the weakening of connections by punishments being renounced. To his law of effect, Thorndike added what he called the "spread of effect," which proposed that rewards not only strengthened the single response, but also strengthened responses in the vicinity, made before and after the rewarded response.[3]

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[2] A conduction unit is not meant to be interpreted as an identifiable physiological structure, but as a convenient hypothetical concept used by Thorndike.

[3] Hilgard, op. cit., pp. 22-36.

Behaviorism and conditioning. A kindred but independent school of psychology, with reference to Thorndike's, was that originated by Watson in 1913 which has been called behaviorism. Watson believed learning could be explained in terms of frequency and recency without regard for the law of effect. According to Watson, responses made most frequently and/or recently would tend to be repeated on recurrence of the stimulus. In the middle 1920's, the Russian physiologist Pavlov performed his famous series of experiments on the conditioned reflex. Watson and his followers accepted his principles of conditioning as a basis for later behavioristic learning theory. According to this theory, the following of the conditioned stimulus by the unconditioned stimulus causes the conditioned response to be strengthened or reinforced.[4] On the basis established by Watson and his school, Guthrie, in forming his contiguous conditioning theory, asserted only one "law" of learning: "A combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by that movement."[5]

Hullian theory. The real successor to both Thorndike's connectionism and Watson's behaviorism was not

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[4] Ibid., pp. 52-56.

[5] Ibid., p. 57.

Guthrie's theory, however, but that produced by Clark Hull and his followers. Learning is described in Hullian terms as follows:

A drive is a strong stimulus to action within the organism, some being innate or primary, others being acquired or secondary. Drive impels the organism to respond to cues, or external distinctive stimuli. If the response to cues in the presence of drive is rewarded in terms of drive or need reduction, the response will be learned. It is the need reduction that causes "rewards" to be rewarding. The action of rewards, as in Thorndike's theory, is automatic.

Hull's theory is based on a technical neural foundation in which stimuli perceived by receptor mechanisms cause inner neural impulses to be activated. These impulses may interact with one another within the nervous system, explaining transfer of conditioned response to original stimulus.

Reasoning and problem solving are explained according to anticipatory responses and habit family heirarchy. Alternative routes to a desired goal are reinforced in graduated relative strength. The response finally chosen is selected in a trial-and-error process in which anticipatory responses serve in turn as stimuli to which all other responses are conditioned. In this way the more strongly reinforced responses will be chosen unless they are blocked. Hull asserts that if one member

of this habit family heirarchy is reinforced, the other members of that family are also reinforced. Habit strength is determined by number of reinforcements and the interval of time separating response from reward. This is called by Hull the "gradient of reinforcement."[6]

. Gestalt psychology. The other general field of psychology that has gained wide acceptance, usually called Gestalt or field psychology, had its origins in Germany, being first propounded and defined by Max Wertheimer in 1912. It gained widespread attention, particularly in America, through publications in English translation of works by the German psychologists Koehler[7] and Koffka[8] in the middle 1920's. These men and their followers seriously attacked the accepted Thorndikian trial-and-error theory of learning and behavioristic psychology. Koehler's experiments brought the insightful nature of learning to the fore, which he proposed as an alternative to trial-and-error learning. His observations, he claimed, produced evidence that apes could obtain reward without the process of stamping out incorrect responses and stamping in correct ones.

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[6] Ibid., pp. 76-113.

[7] Wolfgang Koehler, The Mentality of Apes (New York: Harcourt, Brace and Company, Inc., 1925), 342 pp.

[8] Kurt Koffka, The Growth of the Mind (London: Kegan Paul, Trench, Trubner and Co., Ltd., 1924), 383 pp.

The Gestalt psychologists had their start in the area of perception, where they attacked the associationist position that percepts are made up of sensation-like parts bound together by association. They argued that perception is organized as a whole which is systematic to the extent that it may not be broken up into parts, but is experienced as a field or fields imposed upon grounds. These fields are not static but constantly subject to change.

Koffka believed that the laws of organization in perception could be applied to learning. In his application, the emphasis is placed on the initial adjustment of the learner, to the discovery of the correct response in the first place. Learning situations are problem situations. They result in tensions and disequilibria. In a problem situation, the whole is perceived as incomplete, and a tension is set up toward completion. A strain to complete or achieve "closure" of the situation aids learning, and completion is satisfying.

According to the field psychologists, to learn is to discover. Insight is not merely an enrichment of the learner's experience as it is described in association theory, but is the vital element in the learning situation. Learning, then, is considered by field psychologists to be always a meaningful process, never a mechanical one. Once insight is achieved and the problem solved, repetition is unnecessary. Learning in a repetition of the situation,

however, may be enhanced by the fact that a reproduction of a past situation provides opportunities for a re-examination of the situation and the making of fresh discoveries not perceived the first time.[9]

Lewinian theory. Notable among later Gestalt achievements is the work of Kurt Lewin. Lewin stressed the role of perception in "steering" activity as opposed to the idea of perception initiating activity. He furthered Gestalt theory in its method of describing the psychological situation of an organism. Lewin advanced the conception of the "life space" of the individual; that is, the psychological environment of the individual as seen by that individual. According to Lewin's description, a problematical situation is an unstructured region of "life space" in which the given elements do not present a perceivable route to the goal. The individual must achieve a change in the "cognitive structure" by repatterning the situation in search of a route to the desired goal.

Lewin distinguished between "reward" and the success experience. He pointed out, for example, that several experiences may be success experiences while falling short of goal attainment. To select a socially approved goal may constitute a success experience.

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[9] Hilgard, op. cit., pp. 177-207.

Likewise, to make progress toward a goal may be a success experience.[10]

Association psychology and field psychology contrasted. At the present time, although there are many deviations and theoretical conflicts within psychological schools themselves, learning psychology divides recognizably into the two major camps: association psychology and field or Gestalt psychology. Hilgard[11] has furnished us with a clear and useful description of the major points of difference between the two. A summary of his description is given below.

1. Environmentalism versus nativism. Association psychologists prefer environmentalism, attributing as much as possible to learning. Field psychologists attribute more importance to the way in which the organism is made, in accounting for its interaction with its environment.

2. The nature of wholes and parts. Associationists consider the whole from the standpoint of its composition, or the sum of its parts which may be considered individually. The field theorists consider the whole from the standpoint of its organization, or the relation and interaction of the parts to one another.

3. Reaction and cognition. The associationist

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[10] Ibid., pp. 209-232.

[11] Ibid., pp. 10-17.

position is that there is a directness of connection between situations and the responses to them, with a minimum of mediation by ideas or idea-surrogates. The field theorist infers from observed behavior that a great deal of ideation and cognition of the situation goes on within the organism between stimulus and response.

4. Mechanism and dynamic equilibrium. The preference of the associationists is for bonds, reflexes, and other isolatable factors which can be integrated into habits and habit systems like a machine model. The field psychologists prefer the description of constantly changing organizations in the psychological situation. They assert that living things remain the same because of a patterning or organization persisting in the midst of change, in the manner of a whirlpool.

5. Historical versus contemporary causation. Generally speaking, associationists prefer to account for present behavior of an organism by its past history. The field theorists account for it according to present circumstances.

DESCRIPTION OF THE TWO TEACHING METHODS

The two methods of teaching which were systematically employed respectively in the two classes will hereafter be referred to as Method I and Method II. Method I rested its case primarily on the repetition of stimulus-response

performance accompanied by reward or need reduction, the correct responses being authoritatively identified with no attempt at investing them with meaning. Method II, on the other hand, stressed the importance of discovery of meaning through insight on the part of the learners in the active seeking of recognized goals.

Pedagogy of Method I. The primary dynamics which Method I was intended to emphasize were as follows:

All instruction was to be given in an authoritative manner by the teacher.[12] Each separate activity of learning, e.g., learning the correct note lengths of a rhythmic figure such as a half note followed by two quarter notes, was to be identified by the teacher dogmatically and autocratically. Motivation would be assumed to be present in the learners in the form of any one of a number of social or intellectual drives if the learners obeyed the directions of the teacher. The motivating drives causing the children to respond might be intrinsic or extrensic. That is, the drive might be a real desire to master the activity (intrinsic motivation) or it might have little to do with the activity in question, being rooted in desire for social approval or recognition, etc. (extrinsic motivation).

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[12] The teacher referred to throughout this work was the writer.

Every effort was to be made to keep the children from discovering or verifying the logic or truths that were the reasons for undertaking a given activity. The children must take the supposed truth of the matter on faith. The objective of Method I was to establish habit patterns of performance through application of the laws of learning. Unless the children were to thwart the limitations of the method by secret verification or discovery, they would not know why any activity was performed, or why certain results were correct and others were not.

The procedure of the method was for the teacher to identify an activity by making specific directive statements detailed as much as was appropriate and then to establish the performance pattern by repetition in conjunction with reinforcement or reward in the form of verbal approbation at the end of a correct response. No responsibility was to be placed on the child for the discovery of errors. The teacher would do it for him. He was to be discouraged from experimentation, but encouraged to ask the teacher. Mistakes were to be identified authoritatively by the teacher and "stamped out" by repetition of the correct performance.

Each learning problem was to be isolated as much as possible from any other, and no effort was to be made to correlate any two problems in their relation to one another, or to correlate a segment of learning to the entire

learning process. When one problem was solved, the next was to follow as a new activity.

Pedagogy of Method II. The primary dynamics which Method II was intended to emphasize were as follows:

Instruction was to be given under the assumption that the discovery of meaning is learning. Learning implies insight and does not proceed without it.

Method II was to be the method of self-initiated discovery. Motivation must be intrinsic. That is, the drive must be toward solving the problem at hand. Other motives were considered to be secondary. The child was to be encouraged to find, through an active process of discovery and verification, that the activity in which he engaged produced certain results, and that certain results are better than others.

The teacher's role in Method II was to be that of a leader who might guide the class in its activities. Explanation of an expository nature was not ruled out, but it must be offered as something to suggest further thought and verification by experiment on the part of the children.

Method II was to offer repeated experience of a particular learning problem in many situations. In other words, Method II was to promote the finding of the constant principle in variable situations. Thus, what a casual observer might superficially call "drill" in Method II

was actually to be designed to permit the children to have a prolonged experience with a given situation, that new discoveries might be made in a repetition of an example.

The teacher was to attempt to make meaningful the articulation from one learning problem to the next, suggesting relations of one problem to others and the relation of each problem to the whole learning process.

The procedure of Method II was to be that the teacher would confront the children with a situation in which they recognized the presence of a problem to be solved or a difficulty to be overcome. The attack on the problem must come from the children by means of voluntary suggestions from the group as to the nature of the difficulty and the means to be tried in overcoming it. Free discussion was then to be allowed, in which the children were to try to formulate a plan of attack on the problem. The teacher's role at this stage would be merely to see that the discussion remained pertinent to the problem and to verbally summarize the discussion at appropriate points. Suggestions might be offered by the teacher if they stimulated further thought and discovery by the children. If two or more different opinions seemed to divide the group, several solutions might be tried, with the concensus of the group opinion making the final decision as to which solution proved the most fruitful. Once a decision was reached by the group

or by an individual under observation by the group, the group or individual was to be held to that choice of action, regardless of the opinion of the teacher in the matter, concerning the correctness of the choice. In this way, the consequences whether good or bad, would be a direct experience for the children so that they could observe at first hand the results of their choices.

CHAPTER III

THE STUDY

Preliminary preparations. A written preview of the intended study was presented to the Supervisor of Instrumental Music in the Boulder Public Schools.[1] Having read the preview and discussed the proposed investigation with the writer, the Supervisor granted permission[2] for the study to be carried out within the 1953 Boulder Summer Recreational Music Program, under the auspices of the Boulder Public Schools. The study was to be conducted with children assigned to the group known as the Intermediate[3] Band. He further offered for use in the investigation any published materials available in the school music library or in his personal library. The only stipulations made by the Supervisor were that time spent in conducting the study should not interfere with the

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[1] L. Randall Spicer, B.Mus., University of Colorado, 1936; M.Mus., University of Colorado, 1942.

[2] See Appendix B, p. 104.

[3] The classification "Intermediate" included children in the age group nine through eleven, who had had playing experience of less than a year up to three years, but who were of the same general playing ability level. The classification of children was determined by the teaching staff of the summer music program.

pursuance of any of the regular activities of the program, e.g., preparation of two or three short musical numbers for performance at the annual concert which traditionally climaxes the summer program: and that any information concerning the children which was included in the written report of the study be made in such a way as to preserve the anonymity of the individual children. Permission was also granted for a regular staff member[4] of the summer program to serve as special assistant for the investigation during such time as he was not needed elsewhere.

Permission[5] was secured from the Superintendent of the Boulder Public Schools for the writer to have access to the cumulative record files of the individual children in the investigation, with the consent of the school principals under whose jurisdiction the records were kept. Permission for this was given on the condition that such information as was taken from the files be kept confidential.

It was decided to conduct the investigation over the six week summer program as follows:

During the first week all children in the Intermediate Band were to meet as one group. This week was to be used solely for orienting the children to the

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[4] John E. Stowe, B.Mus.Ed., University of Colorado, 1951; M.Mus.Ed., University of Colorado, 1953.

5 See Appendix B, p. 105.

experience of playing together under the direction of the teacher, and for enabling the teacher to make observations of the children which might help him in determining the composition of the two groups. Two factors influenced the decision to spend the first week in this way. First, a local vacation Bible school which many of the children attended during the morning overlapped the summer music program by one week making it necessary for the directors of the summer music program to hold their classes in the afternoon during the first week. Since the afternoon class schedule had been made for the summer music program before plans for the study were included, no provision was made for holding two Intermediate Band classes instead of one, and no time or classroom space existed in the first week schedule in which two Intermediate classes could be held. Second, in preliminary discussions with the teachers of the summer music program, the writer was assured that in previous years, late registration had always been heavy during the first week. Since late registration of a large number of children would appreciably affect the stability of the two groups, it was considered inadvisable to begin the study before the second week.

During the second, third, fourth, and fifth weeks, the children were to be divided into two classes, each class meeting for an hour each morning, Monday through Thursday. Fridays were set aside for administering the objective tests which will be described in a later section.

During the sixth and final week of the summer music program, the final tests of the investigation's measurement program were to be administered, individual testing on Monday and group testing on Tuesday. Following the tests on Tuesday the two classes would be united into one band which would rehearse for the remainder of the week in preparation for the public concert on Friday evening.

It will be seen from the above description of the schedule that the study itself occupied four full weeks beginning with the second week. Of the two extra weeks, one before and one after the investigation proper, the first was taken up with orientation and observation, the last with completion of measurement and rehearsal for public performance.

The materials. The same published music was to be used in teaching both classes in the study. For use in the preparation of music for the public concert, the Supervisor, Mr. Spicer, furnished a set of books[6] from his personal library that experience had demonstrated to be appropriate for the Intermediate Band, both in level of difficulty and in attractiveness to the children. Music in these books was used in the investigation as supplementary material and also for the group tests in the final evaluation at the end of the study.

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[6] Fred Weber, Fun for All (Rockville Centre, L. I., New York: Belwin, Inc., 1951), 16 pp.

For use as the principal material in the study, a survey of several selected and available published methods[7] was made, The following criteria were used in evaluating the various methods after consultation with teachers experienced in teaching instrumental music classes on the intermediate level:

1. Attractiveness in general appearance. This criterion was concerned most directly with the amount of printed material on a page and the largeness of the printing. Ease of discrimination in reading is obviously a prerequisite to efficient learning irrespective of different learning theories.

2. Completeness in coverage of problems. This criterion was concerned with the opportunity afforded in a given method for working on the problems in learning on which the children were to be measured.[8]

3. Repetition of problems. All widely accepted learning theories regard similarity of situations prerequisite to transfer of training; therefore, repetition of previous problems in new situations is necessary to good learning in a continuous area of endeavor.

4. Musical quality of examples. Two points of reference were used in evaluating the various methods:

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7 Published "methods" meaning class instruction books should not be confused with "teaching methods" as defined on page 12.

8 See discussion, pp. 42-49.

first, melodic arrangement of note and rest values in such a way as to hold the child's interest; and, second, opportunities for developing the taste of the children with regard to organization of musical phrases.

5. Similarity of all parts. Strictly melodic construction, i.e., all instruments, except drums of course, given the same melody in unison or octaves, was favored over division into harmony parts. This was for the purpose of keeping identical the materials on which the children's performance would be observed and tested.

6. Sparseness of written explanation and instruction. Since the purpose of the study was to test by comparison two instructional procedures, any additional instruction or explanation to which the children might be exposed was undesirable. Therefore, this criterion was considered of great importance.

On the basis of the above criteria, the published method chosen as best for the purpose of the study was the Belwin Elementary Band Method.[9]

Selection of subjects and grouping into classes. During the first week of the summer music program the teachers on the staff were chiefly concerned with finding the proper assignment for children who had not been placed during registration. Once the Intermediate Band group

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[9] Fred Weber, Belwin Elementary Band Method (Rockville Centre, L. I., New York: Belwin, Inc., 1945), 37 pp.

had achieved some degree of stability, the teacher and assistant set about gathering information concerning the individual children upon which their division into two classes would be based.

The fact that subjective observations were to be made, comparing the performance from day to day of the two classes, made it important that approximate equality in composition should exist between the groups. Random selection would have been preferable had the only object been the obtaining of objective statistical measurements, since statistical analysis takes into account differences attributable entirely to chance.[10] Under the circumstances, it was thought best to sacrifice theoretical statistical accuracy in order that observational comparisons could also be made. This is another of the reasons that the writer does not consider the study, strictly speaking, to be a laboratory experiment. The bearing of the writer's method of grouping on the interpretation of statistical data obtained will be discussed further in Chapter V.

It was the viewpoint of the writer that innumerable factors in the life of a child might influence his ability and achievement in the study. It was therefore decided not to limit the basis for grouping to a single set of statistics of test achievement, but rather to base the

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[10] Allen L. Edwards, Experimental Design in Psychological Research (New York: Rinehart and Company, Inc., 1950), pp. 20-22.

grouping upon as many data on each child as could be collected from all possible sources prior to the grouping.

The use of a musical aptitude test was deemed inadvisable, inasmuch as the validity and reliability of such tests as have been devised have not been substantiated by research into correlation of test achievement and later success.[11] Certain studies[12] have suggested strongly that a recognizable correlation exists between intelligence and musical ability, and between literary ability and musical ability. General school achievement is not consistent, in many cases, with intelligence test scores, but may reveal strong drives to succeed. Records kept in the Boulder Public Schools indicating each individual child's scores on an intelligence test,[13] a language test,[14] and his general school achievement and musical achievement were therefore consulted. Social adjustment and personality traits as reported in school anecdotal records were taken into account; any factors concerning a child's health that might affect his performance in the study, such as

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[11] Gordon Hendrickson and Clara G. Stratemeyer, "Music Education," Encyclopedia of Educational Research, 1950, pp. 763-64.

[12] Ibid., p. 764.

[13] California Test of Mental Maturity, short form, (Los Angeles, California: California Testing Bureau).

[14] Co-operative English Test, (New York: American Council on Education).

defective eyesight or hearing, were noted. Where it was possible, the writer discussed individual children with the child's previous teacher, preferably his music teacher, and in some cases his homeroom teacher or principal.

In addition, a questionnaire[15] was prepared and distributed among the children for completion. It was designed to reveal factors of the musical background of the children. It was not expected that the answers of all the children would furnish information of value, but that some otherwise overlooked facets of some children's musical backgrounds might come to light. Answers to certain of the questions, viz., those concerning private lessons, were checked with school files and discussion with music teachers in Boulder and with parents. A check was also made by asking children additional questions designed to reveal sufficient knowledge on the part of the children to warrant the truthfulness of the answers. It was found that the children had answered truthfully to the best of their knowledge.

On the basis of all information collected, the pupils were divided into two classes. The first consideration was instrumentation. Instrumentation of the Intermediate Band was as follows: three flutes, four saxophones, two trombones, five drums, and the remainder divided between

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[15] See Appendix C, p. 106.

clarinets and cornets. It was considered desirable to have, as nearly as possible, the same instrumentation in both groups; the groups were accordingly divided into two classes with identical instrumentation, except in cases where the number of children playing a certain instrument was an odd number, in which case one group must obviously have one more or one less than the other.

The basis for dividing the children into the two groups was not that of pairing the children. In the writer's opinion the use of paired individuals is unsound, since human beings, being individuals, are not capable of being equally paired with other individuals. Neither was the basis of division that of random selection, for reasons already discussed. It was the endeavor of the writer to see that approximately equal numbers of children of all ability levels, musical backgrounds, and achievement levels went into the composition of the two groups. In this way, it was thought that neither group would be "weighted" in any direction in terms of ability, background, or achievement.

Two other factors should be mentioned. No attention was given to sex differentiation in dividing the children. As it happened, the groups divided fairly evenly with approximately the same number of boys and girls in each group. Attention was given to the factor of age, and again the procedure was to place an approximately equal number of all age levels into each group.

Physical facilities. Before the present study was introduced into the summer program, it had been planned that all band classes would meet in the Boulder High School bandroom which was situated on the main floor in the northwest corner of the building. The schedule of classes did not, however, allow sufficient time for two hour-length classes of the Intermediate Band to be met daily. It was therefore necessary for other arrangements to be made.

The Supervisor, Mr. Spicer, suggested using the room upstairs known as the choir room and holding the two classes from ten to eleven a.m. and eleven a.m. to twelve noon respectively.

The choir room (see Figure 1) was rectangular in shape, measuring 25 by 35 feet with a high ceiling. It was equipped with permanent elevated tiers for the choir's placement, the first tier beginning twelve feet from the east wall; there were seven tiers in all, graduated in height so that the greatest elevation was reached in the tier adjacent to the west wall.

In the choir room were found a large number of metal folding chairs, a piano, and a rectangular wooden table whose surface measured three and one-half by six feet. The piano and table were pushed as far toward the east wall as possible. Such chairs as would be needed were taken to the front (east) half of the room and arranged in proper position; the other chairs were pushed as far as

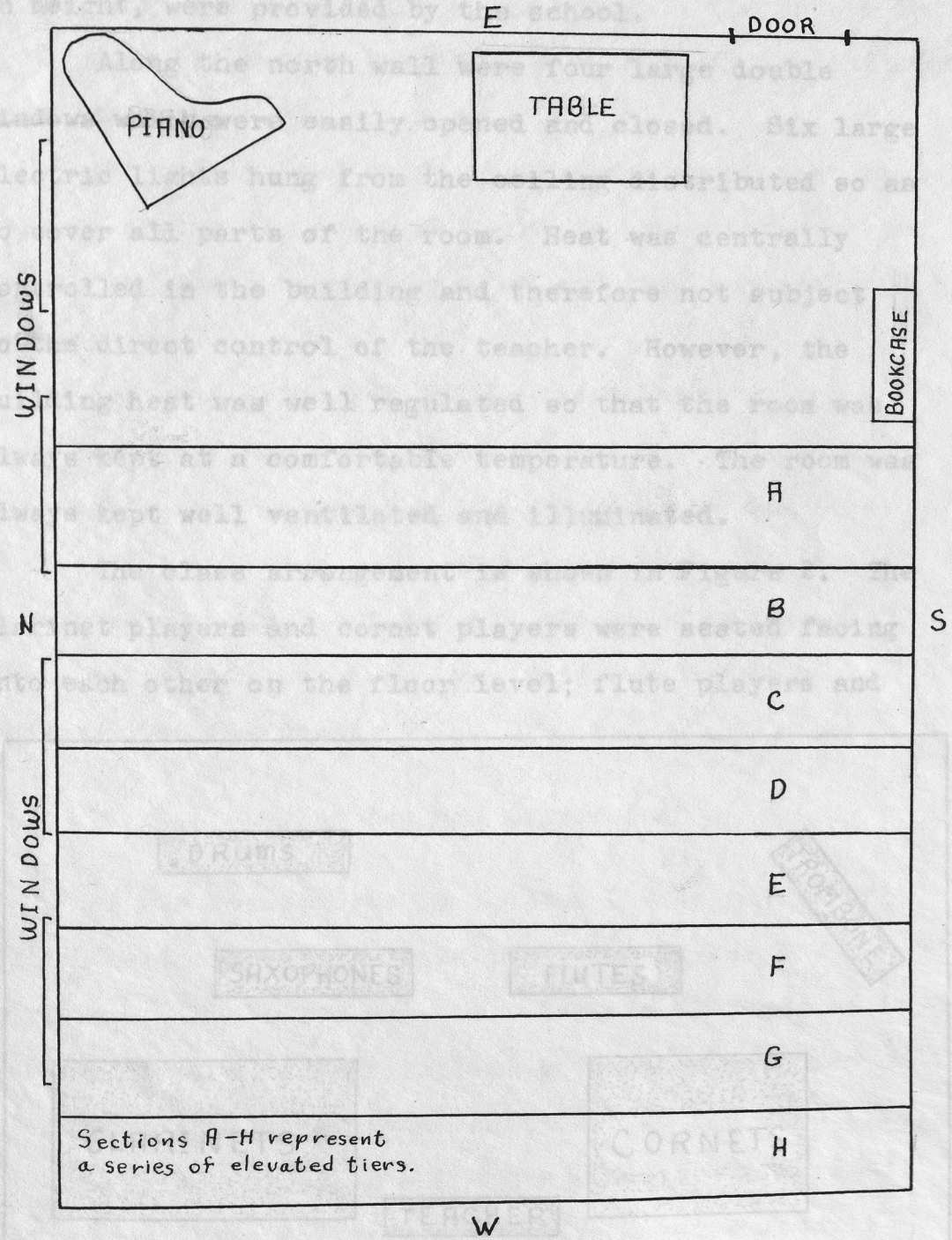

FIGURE 1

DIAGRAM OF THE CHOIR ROOM, BOULDER HIGH SCHOOL

possible to the rear (west) of the room and stacked on the top tiers out of the way. Folding metal stands, adjustable in height, were provided by the school.

Along the north wall were four large double windows which were easily opened and closed. Six large electric lights hung from the ceiling distributed so as to cover all parts of the room. Heat was centrally controlled in the building and therefore not subject to the direct control of the teacher. However, the building heat was well regulated so that the room was always kept at a comfortable temperature. The room was always kept well ventilated and illuminated.

The class arrangement is shown in Figure 2. The clarinet players and cornet players were seated facing into each other on the floor level; flute players and

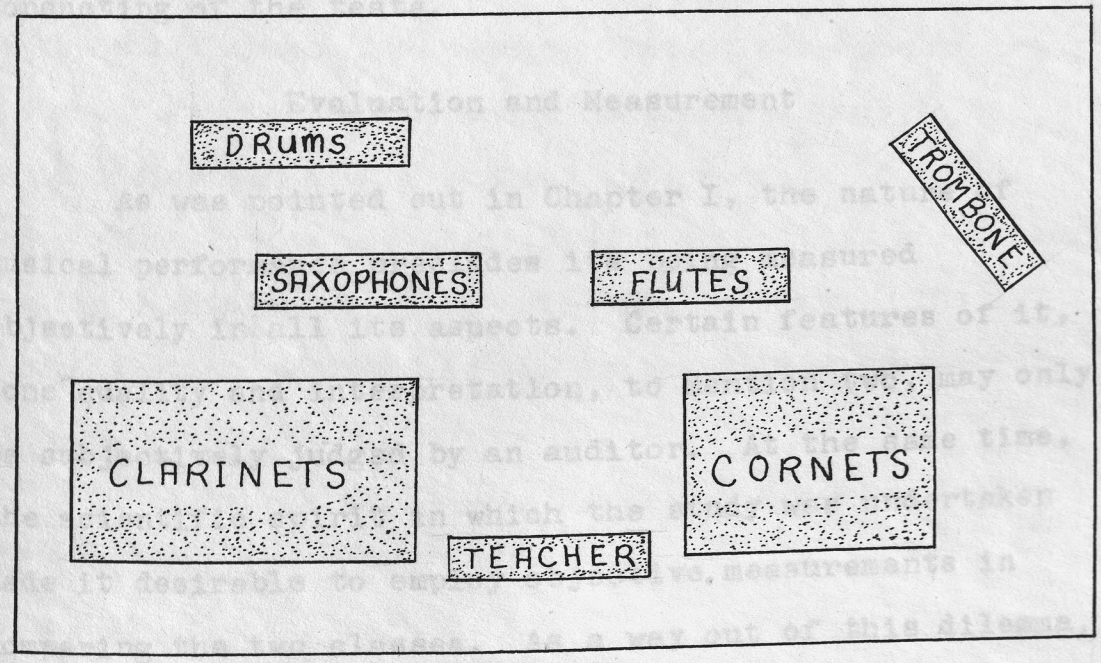

FIGURE 2

SEATING ARRANGEMENT OF THE CLASSES

saxophone players sat on the second level tier facing the teacher; the trombone player sat on the third level facing the teacher; and the drum players stood on the fourth level in the rear facing the teacher. A maximum of two children shared a music stand.

The room proved sufficiently soundproof that the noise of string classes rehearsing in the cafeteria next door to the choir room did not at any time penetrate into the classroom.

For use in the individual tests which will be described later the Supervisor offered his office which was a small room adjacent to the bandroom on the first floor of the building. It contained a desk and chairs which were used in the tests and stacks of music and other equipment which in no way interfered with the conducting of the tests.

Evaluation and Measurement

As was pointed out in Chapter I, the nature of musical performance precludes its being measured objectively in all its aspects. Certain features of it, tone quality and interpretation, to mention two, may only be subjectively judged by an auditor. At the same time, the scientific spirit in which the study was undertaken made it desirable to employ objective measurements in comparing the two classes. As a way out of this dilemma, it was decided to carry out, concurrently, two independent

measurement programs in the study, one subjective and the other objective. In this way, it was felt, all observable phases of performance might be dealt with, those that require subjective evaluation judged subjectively, and those that may conveniently be quantified measured objectively.

The subjective observation program. The criteria for the subjective evaluations were derived from those standards generally accepted by American music educators, as reflected in endorsement by their national organizations and in the widespread use of the standards in contests and festivals of instrumental music.[16] These criteria[17] center around large general categories that are then subdivided into more particular criteria. Of the large general categories, six were adopted as relating to the performance of the two classes, the category "stage deportment" being dropped. For the purposes of the present study, a simplification of the smaller sub-headings of the general categories was desirable in order that all criteria finally used might receive attention in class. The simplification resulted in the following divisions:

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16 Paul Van Bodegraven and Harry Robert Wilson, The School Music Conductor (Chicago, Illinois: Hall and McCreary Company, 1942), pp. 67-75.

17 Ibid, p. 69.

TONE

Beauty
Control

INTONATION

Ensemble tuning
Melodic intervals

INTERPRETATION

Phrasing
Dynamics
Expression
Rhythm

TECHNIQUE

Precision
Articulation

GENERAL EFFECT

Spirit
Contrast

Progress within the groups as observed by the teacher and his assistant according to the above criteria was recorded daily in the diaries kept for each of the classes. Subjective observation is rendered more unbiased and impartial if the observation is ordered according to predetermined categories. With this in mind, the teacher and assistant observed each day's classes using a fourfold frame of reference for their daily entries: attitudes of children; attention of children; emotional demonstrations; and description of class procedure.

In another effort to approximate objectivity as nearly as possible, to diminish the possibility that personal prejudice and involuntary favoritism might influence the teacher's observations, it was decided that

an impartial person, experienced in adjudication of instrumental groups, who was unfamiliar with the particulars of the study, should be invited to judge the performance of the individual children and the two classes as performing ensembles. Such a person[18] volunteered his services, and the judging took place on the first two days of the final week in the summer program, the individual testing on Monday and the group testing on Tuesday. For the individual adjudication, the criteria were adapted from the form[19] used for judging instrumental solos in contests and festivals:

TONE

Beauty
Control

INTERPRETATION

Tempo
Phrasing
Expression

TECHNIQUE

Tongueing
Fingering
Breathing

EMBOUCHURE

RHYTHM

INTONATION

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[18] Roman Tross, M.Ed., University of Missouri, 1951; Director of Bands, New Mexico College of Agriculture and Mechanical Arts.

[19] Solo and Ensemble Adjudicator's Comment Sheet, (Chicago, Illinois: National School Band, Orchestra and Vocal Associations, 1941).

Categories eliminated from the judging form which were irrelevant to the purpose of the study were "selection"; "accompaniment"; "general effect"; and "memorizing."

For the individual testing, the examples used were taken from the published method[20] that had been used in class. For the group testing, each band played the same musical selection[21] which was to be played at the public concert.

During the individual testing, which was held in the classroom, the children were brought one at a time into the room and asked to play each of the two examples twice. Before beginning, each child was requested to tune his instrument to a given tone played by the child who preceded him in the test. The first child was asked to tune his instrument to a tone played on the piano. Each child was also allowed to try the first note in each example before playing. The children were seated in a chair with the music stand in front of it. The chair and stand were placed so that the child's back faced the judge while he listened to the playing.

The objective measurement program. The objective measurement of performance in the investigation was accomplished through interpolated tests given to the children individually on Friday of each of the four weeks in the

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20 Weber, Belwin Elementary Band Method, op. cit.

21 Weber, Fun for All, op. cit., p. 2.

study. Each child was given an individual appointment for his "tryout" each Friday morning. The testing began at 8:30 Friday morning and usually ended at noon. The form of administering and scoring these tests was adapted from Watkins'[22] system of measuring instrumental performance.

Watkins' measurement is in terms of number of errors made during a given performance, the errors being carefully defined previously. The errors defined by Watkins were simplified for the present investigation into six error types as follows:

1) Errors in pitch. Any tone added or any tone omitted constituted an error; any note played on the wrong pitch constituted an error. These errors were represented in scoring by a "W" standing for "wrong note" marked for each error. No error was counted for fuzzy attacks or minor irregularities in pitch; no error was counted if a note was played on the wrong partial while the player fingered correctly if the tone was immediately adjusted by the player to the correct partial without attacking again. Such errors would involve subjective judgment, and therefore could have no place in an objective measurement.

2) Errors in length of notes and rests. Any note not held its correct length value was considered an error;

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22 John G. Watkins, Objective Measurement of Instrumental Performance (New York: Teacher's College, Columbia University, 1942), pp. 42-53.

the ignoring of a rest or the failure to sustain a rest its correct value was considered an error. These errors were represented by an "R" standing for "rhythm errors" marked for each error. Watkins' rule was that a note or rest must be within one beat of its correct length either way. However, in a practice test made before the study began, the writer discovered that it was possible to discriminate the time errors within one half a beat without employing subjective judgment, and therefore modified this rule accordingly.

3. Pauses. Any pause or hesitation by the player that interruped the metric flow of beats by a margin of one half a beat or more was counted an error. These errors were represented by an "H" standing for "hesitation" marked for each error. Watkins' unit of measure was the measure bar. For this reason he did not count pauses between measures as errors, but only pauses within the measure. With this rule the writer disagreed, feeling that such a rule made the scoring conform to the mechanics of measurement rather than making them conform to the nature of the quantity to be measured. Since the correct performance of an example requires steady metrical playing from beginning to end of an example, any pauses of one half beat or more were considered errors no matter where they occurred.

4. Breathing errors. Watkins did not consider incorrect breathing to be an error apparently, for his

error categories do not contain it. However, breathing is decidedly a factor in correct performance and may be easily observed objectively; therefore, breathing errors were incorporated into the objective measurements. An error was counted if the performer failed to take breath where breath marks were printed in the music or if he took breath at any place other than those places indicated. In scoring, a "B" for "breathing error" was marked for each error.

5. Change of tempo errors. An error was marked if the player increased or decreased the tempo given him by more than twelve beats per minute. These errors were indicated by a "T" standing for "tempo error" marked for each error.

6. Articulation errors. A slur omitted, a tongued note slurred, a slur carried over to notes which should be tongued, or a broken slur were all counted as errors. These errors were represented by the symbol "Sl" standing for "slur error" marked for each error.

Errors in Watkins' system concerning holds, repeats, and expression marks were discarded since none of these items occurred in any of the test examples used. Also discarded was Watkins' use of the measure bar as the unit of measure in which a measure containing three errors counted for no more than a measure with one error. The writer's system was to sum the total number of errors of each type regardless of their distribution.

The administering of the tests was done by the teacher or assistant. The procedure followed was taken from Watkins[23] with a few variations to meet the special needs or physical accomodations of the study. Briefly described, the procedure was as follows:

Pupils were brought in for their tests in twos or threes, the teacher giving the tests while the assistant supervised those waiting for their tests. The children brought in were told to get their instruments warmed up and ready for the "tryout." One child at a time was taken into the testing room while the others that had been brought in with him were allowed to warm up their instruments.

Once inside the testing room, the subject was seated with the music stand before him adjusted to a convenient height, his back to the tester's desk. The music book on the stand was closed. On the tester's desk was a contrivance consisting of a wooden rectangular frame covered on top with a sheet of glass slanting at a convenient writing angle. Under the glass was an electric light bulb connected by a wire to an outlet. On a sorting rack to the tester's right were placed the books to be used. When a single page of music was placed on the glass and a blank sheet of paper over the page, the electric light shining through the glass rendered both pages transparent,

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[23] Ibid., pp. 49-53.

enabling the tester to see the music through the paper and mark errors on the test sheet exactly where they occurred.

After writing the subject's name on the test sheet, the tester directed him to turn to the first example, which he had studied in class. He was then directed to try the first note in order to be sure of it. He was told not to stop playing once he had started even if he made mistakes and that he would be given another chance to play it. The metronome, set at 66 beats per minute, was then started and the subject was instructed to listen to it. The tester counted aloud the beats of the measure in time with the metronome. Two beats before the subject was to begin, the metronome was turned off and on the next two beats the instruction was given: "ready--play."

Each subject was given three trials on all examples. After the first example had been played three times, the subject was told to turn to the second example, with which he was unfamiliar. The same procedure was followed as with the first example. At all times the tester endeavored to maintain a cheerful non-critical attitude. If the subject asked at any time how he was doing, he was always told he was doing very well. When a subject had finished his test he was told he might leave. When a child left the testing room the assistant sent the next child in.

If a child was absent on a Friday for any reason, instructions had been given on Thursday for him to come early the following Monday for his "tryout." If he was

in the first class, the teacher tested him on Monday; if he was in the second class, the assistant tested him while the teacher was teaching the first class. In this way, no tests were given after further class instruction had begun.

The examples[24] used in the tests were, with one exception, all taken from the published method used in class. On the final test, an example similar to those that had been studied was used for the unfamiliar example. This was done in order to find out whether any differences in scores would result. It was thought that since the books used in class had been in the hands of the children in class, it was possible that some children might have been able to familiarize themselves with the "unfamiliar" examples used in the tests. The results of this substitution will be discussed in Chapter IV.

In each test after the first, the familiar example was the example that had been used for an unfamiliar example in the previous test.

Records kept in the study.[25] Attendance at class was carefully checked each day and recorded for each class during the four weeks of the study. An individual information sheet was kept for each child containing all the confidential information taken from school record files.

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[24] See Appendix D, p. 107.

[25] Records kept in the study will be found in Appendices E and F, pp. 108-115.

At the end of the study, these were destroyed.

A diary was kept for each of the two groups, describing briefly the activities included in class each day and any observations made by the teacher or assistant. It was originally hoped that these diaries could be kept during class entirely by the assistant. Early in the program, however, it became apparent that no guarantee could be made that the assistant would be free from other duties for the entire two hour period each day. Therefore, the diaries were kept in the following way: If the assistant was free he wrote down briefly in outline the class activities as he observed them. Between the two class periods the teacher added brief personal notations of his own. After the second class was dismissed the teacher completed the daily record, detailed as much as he thought necessary.

Examples of Class Procedures

Having described previously the pedagogical approaches to each of the two classes, and the problems to be undertaken in them, the writer believes that a few sample illustrations of the procedure of each method in specific problems might afford the reader a clearer understanding of the two methods.

Intonation. In Method I, the procedure was as follows:

One child, usually a different child each day, played a tone to be used as a tuning note. Each child was then asked individually to play the same tone, the teacher instructing each child which was the proper tone on his particular instrument. The teacher informed each child of the correctness or incorrectness of the pitch of his tone by saying, "You're sharp; pull out," or "You're flat; push in," or "You're in tune." Each child in turn adjusted the tuning mechanism of his instrument as directed until the teacher expressed satisfaction with the pitch.

In Method II, the procedure was as follows:

Intonation as such was not taken up at a particular time in class isolated from other activities. It was taken up only when members of the class noticed faulty tuning or "sour" sounds as some of them put it. After the class had played through an example in the book, the teacher asked for voluntary expressions of opinion as to how the playing might be improved. If a particular note was thought to be faulty by concensus of the group, experimentation followed, the object being to correct the fault. One child was asked by the teacher to play the tone. Each child thereafter individually played the same tone. After a child had played his tone the teacher asked him whether he thought his tone was higher, lower, or about the same compared to the given tone. Regardless of his answer, he was then asked to try again, playing and listening,

several times to make sure. The teacher never indicated his own opinion in the matter, making the child entirely responsible for the choice. Once the child had decided that he was playing the tone out of tune, he was asked to experiment by adjusting his tuning mechanism in different ways trying to match the tuning note. When a child was satisfied with his own pitch, the teacher went on to the next child, following the same procedure. The children were cautioned not to help one another in deciding on the correctness of pitch unless a child asked for help from the class. As the program entered its second week, asking for assistance became rare.

Tone. In Method I the teacher criticized faulty tone quality directly, giving arbitrary directions for correction. Posture, breath support, position of instrument, and embouchure were the principal means by which the teacher attempted to make improvement. Time was taken each day for drilling on proper posture, breath support, etc., the teacher making specific directions for corrections and commending the children verbally when they complied.

In Method II, the children experimented individually with different postures, instrument positions, and embouchures. These were usually suggested by the teacher. Included in the various postures and positions tried were those the teacher had observed in various children as they

played in class and also the ones considered privately by the teacher to be correct. Sometimes the children were asked to close their eyes and listen while one member of the class played, using different methods of tone production indicated by silent signals from the teacher. The class then voted on the best sound, after which they opened their eyes and were shown which methods of posture, embouchure, etc., they had selected by vote.

Note and rest value. All the children in the two classes had previous knowledge of the meaning of the written symbols for note and rest values. In Method I, the object of the teacher was to get correct responses from the children to the printed symbols by means of authoritative directions and criticisms.

In Method II, self-criticism by the children was emphasized. Attention having been directed by the teacher to the printed note and rest values, the children were asked to find mistakes in their playing, and to try to correct them on further trials. Each example was tried several times until the children indicated by vote that they were satisfied with their performance.

Interpretation. In Method I the correct interpretation was decided on by the teacher. He gave appropriate verbal directions to the group, telling them where to play loud, where to play soft, where to breathe, how fast to play, etc.

In Method II the teacher offered the children a variety of methods of performance which were tried and voted on by the group. Breathing in various places in an example was tried, the group deciding on the places that sounded best. In the musical pieces being prepared for the public concert, the group tried playing the melody parts soft and the accompanying parts loud, and vice versa; it tried playing all parts loud, and all parts soft, deciding afterwards which ways were best. Any later directions made by the teacher were limited to reminding the children of their own previously made choices.

It should be pointed out that the teacher maintained, as nearly as possible, the same personality and manner toward the children in both groups. It should not be thought that in one class he assumed an unpleasant dictatorial personality and then turned into a warmly sympathetic person in the other class. It was the endeavor of the teacher to vary only the method of class procedure.

It will be obvious to any person with classroom teaching experience that no class could be conducted with children of this age level without some authoritative directions given to keep order and maintain discipline. In Method II the teacher's practice was to limit such direction to the minimum found necessary to keep order in the class.

CHAPTER IV

THE RESULTS OF THE STUDY

Basis for Comparing the Groups

In compiling the results of the investigation for interpretation, the following basis of comparison was adopted:

It was assumed at the beginning of the study that of all the children in the two classes, a certain percentage would either drop out or be absent from class over a sufficient length of time to render their observed progress invalid for comparison with the progress of children who had not been absent for an extended length of time. It was decided that absence over a period of four successive days (one week of class) would be considered sufficient reason for dropping a child from the individual testing and observation programs. Absence for one or two days preceded and followed by attendance was not considered to be reason for discarding a child's scores, even if the total absences accrued amounted to four or more.

Approximately twenty-five children were finally enrolled in each of the two classes by the first week

of the study (second week of the summer program). As was expected, several children from each class were absent for a week or more of class because they were taken out of town on vacation by their parents. When these children had been eliminated a total of twenty-two children were left in one class and twenty in the other. In addition, two more children were dropped from the measurement program for individual reasons. One boy, a drummer, found it necessary to change from the eleven o'clock class to the ten o'clock class during the second week of the study because of a time conflict with a summer swimming class. Obviously the results of this boy's scores would be inconclusive from the standpoint of comparing the relative effectiveness of the two teaching methods. Another boy was dropped because during the second week of the study he fell and injured his lips so that he was unable to play his clarinet until the final week. Although he attended class faithfully every day, it was thought that the loss of actual playing practice in class invalidated his test results. After these children had been dropped, twenty children remained in each group, although the instrumentation had been slightly altered: two flutes in one class and one flute in the other; two saxophones in one class and one saxophone in the other; three drums in one class and two in the other.

In comparing the results of the objective tests, it was decided to include the scores of the drummers in

computing total errors for each group. However, in analyzing the results of the various types of errors individually, it was decided to include the scores of the drummers only in those areas where it was possible for them to make errors, i.e., errors in note and rest values, errors in tempo, and hesitation errors.

Results of the Subjective Observation

Daily observation. Examination of the daily entries[1] in the diaries reveals observed changes that may be summarized as follows:

During the first two days of the study no appreciable differences in the quality of work done in the two classes respectively was observed. All the children appeared to be interested in class activities, presumably because of the novelty of the situation. On the third day differences began to appear. The children taught by Method I were observed to be making definite progress in ensemble playing, especially in the matter of unison attacks and releases. They responded quickly to directions and improved noticeably over several trials of an example in the book.

The children taught by Method II, on the other hand, appeared to be making little progress if any. More time

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[1] Excerpts from the diaries will be found in Appendix F, pp. 110-15.

was found necessary in preparing a single musical example. Children were shy in offering criticisms. Ensemble playing was ragged and uneven, complete unison in attack and release being very rare. By the end of the first week considerable progress was noticed in all areas except intonation and interpretation in the group taught by Method I, while improvement in any areas was negligible in the group taught by Method II.

No further change in performance of the two classes was observed until Wednesday of the second week. The first evidence of the change was in intonation. Several of the children taught by Method II showed little hesitation on that day in deciding on the difference in pitch between their own playing and a given tone, and also in deciding what remedial procedures were necessary. This ability in pitch discrimination was shown again and among more children on the following day. Also noticed was a tendency among several children to apply the information they had previously discovered concerning the relation of good posture and embouchure to pleasing tone quality. Performance of exercises in unison was still characterized by lack of group precision in attack and release.

In the class taught by Method I, little change was observed in pitch discrimination. The children always waited for the teacher to tell them whether or not they were in tune, sharp, or flat and what to do

by way of correcting faulty intonation. Little improvement was noticed in tone quality in this group. Those who had always played with good tone quality continued to do so, and those who had not showed no tendency to change. Repeated reminders by the teacher to assume a posture conducive to good tone production were effective only temporarily, having to be made several times during the same class period and all over again the next day. The ability of this class to play well together with precise attacks and releases, which had been strongly commended verbally by both the teacher and assistant, began to fall off noticeably. More trials were required per example to achieve a performance satisfactory to the teacher; once a satisfactory performance was made, it seemed difficult to repeat in the same way.

During the third week, the gains noticed in the class taught by Method II were observed to increase steadily. By Thursday most of the children in this class were displaying unusual sensitivity to accuracy of intonation. Tone quality, judged from the standpoint of both beauty and blend, was thought to be distinctly superior to the tone quality of the class taught by Method I. Noticeable progress was also being made in solving the problem of precision in attacks and releases. The level of overall performance in the class taught by Method I was judged to be about the same as it had been

the previous week.

During the fourth week, the final week of the study, the children taught by Method II began to show a real awareness of the problem of ensemble balance, They decided, as a group, without hint from the teacher, which parts in the non-unison musical examples were important and which were secondary. Although in neither of the two classes, in the teacher's opinion, was an entirely satisfactory ensemble balance achieved, the group taught by Method II went further in solving the problem than the group taught by Method I who were told directly which parts to bring out and which to play softly.

An interesting feature observed during the study was the difference in general attitude shown by the children in the two classes as the study went forward. Toward the end of the study (about the last week and a half) definite signs of restlessness began to appear with recurring frequency in the class taught by Method I. Discipline became increasingly a problem in this class. The children seemed unconcerned with any class activity in which they were not directly involved. When the teacher turned his attention to one child or section, the rest of the children usually occupied themselves with conversations among themselves, which were permitted so long as they did not create too great a disturbance.

The children taught by Method II, on the other hand, seemed genuinely interested in the problems they were attacking in class. In the teacher's opinion, judging from the observed behavior of the children in class, the children were motivated by desire to solve the problems of music making with which they were confronted. When problems centered in one individual child or in one section, most of the other children focused their attention on that child or section, apparently interested in seeing what would happen. Not infrequently spontaneous suggestions were made from members of one section to members in another section, usually without permission from the teacher. Disturbances serious enough to call for disciplinary intervention by the teacher, while not entirely absent, were certainly rarer occurrences in this class than in the class taught by Method I.

One fact that seems significant to the writer in connection with the foregoing paragraphs is that several of the children taught by Method II who had been given descriptions as "problem children" in school records examined prior to the study were among the most co-operative children in the class.

Results of the final adjudication. The tabulated ratings given the individual children and the two classes respectively as ensembles are presented in Table I.

TABLE I

RATINGS GIVEN ON FINAL ADJUDICATION

A. Frequency of ratings given individual children taught by Method I.

	Familiar Example				Unfamiliar Example			
Ratings:	1	2	3	4	1	2	3	4
TONE	4	5	7	2	3	4	7	4
Beauty	4	5	7	2	3	4	7	4
Control	4	5	7	2	3	4	7	4
INTERPRE-TATION	2	8	8		2	7	9	
Tempo	13	4	3		8	6	6	
Phrasing	2	7	9		2	7	9	
Expression	2	7	9		2	7	9	
TECHNIQUE	5	7	6		3	6	9	
Tongueing	3	5	10		3	6	9	
Fingering	14	2	2		10	4	4	
Breathing	3	3	12		2	5	11	
EMBOUCHRE	4	5	7	2	3	4	7	4
RHYTHM	13	4	3		10	4	6	
INTONATION	2	4	9	3	2	3	11	2
OVERALL	4	4	12		3	6	11	

RATING SCALE:

1 Excellent
2 Good
3 Fair
4 Poor

TABLE I (continued)

RATINGS GIVEN ON FINAL ADJUDICATION

B. Frequency of ratings given individual children taught by Method II.

	Familiar Example				Unfamiliar Example			
Ratings:	1	2	3	4	1	2	3	4
TONE	4	8	5		3	9	4	1
Beauty	6	6	5		4	8	4	1
Control	4	7	6		4	8	4	1
INTERPRE-TATION	7	7	3		5	8	4	
Tempo	12	7	1		12	7	1	
Phrasing	7	5	5		5	6	6	
Expression	7	6	4		5	6	6	
TECHNIQUE	9	7	1		7	8	2	
Tongueing	6	8	3		7	6	4	
Fingering	13	4			13	2	2	
Breathing	3	8	6		5	8	4	
EMBOUCHRE	6	7	4		4	8	5	
RHYTHM	17	3			12	8		
INTONATION	5	8	4		5	10	2	
OVERALL	8	9	3		6	11	3	

RATING SCALE:

1 Excellent
2 Good
3 Fair
4 Poor

TABLE I (continued)

RATINGS GIVEN ON FINAL ADJUDICATION

C. Ratings given the two classes respectively as performing ensembles.

	Class Taught by Method I	Class Taught by Method II
TONE	2	1
Beauty	2	1
Control	2	2
INTONATION	3	1
Ensemble Tuning	2	1
Melodic Intervals	3	2
INTERPRETATION	2	1
Phrasing	2	1
Dynamics	2	1
Expression	2	1
Rhythm	1	1
TECHNIQUE	1	1
Precision	2	1
Articulation	1	1
GENERAL EFFECT	2	1
Spirit	2	1
Contrast	2	1
OVERALL	2	1

RATING SCALE:

1 Excellent
2 Good
3 Fair
4 Poor

It will be seen that the individual children taught by Method II received more "1" ratings in eleven out of fifteen categories than the children taught by Method I, and received more "2" ratings in ten out of the fifteen categories than the children taught by Method I in the performance of prepared examples. An even higher ratio of the two highest ratings favoring the children taught by Method II is apparent in performance of unfamiliar examples.

More important than this surface analysis, however, is the way in which the two groups are weighted respectively in the overall individual ratings. It will be seen that the children taught by Method I have their greatest concentration in overall ratings on the borderline of "2" and "3," with the concentration leaning toward the "3" column; a majority of the children in this group actually received an overall rating of "3." The group taught by Method II has its greatest concentration between the ratings "1" and "2," seventeen out of the twenty children in this group having received the overall rating of "1" or "2."

In addition to the categorical ratings given the two classes respectively as ensembles, the adjudicator, Mr. Tross, wrote the following general comments:

I observed that in the second band[2] which I heard,

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[2] The class taught by Method II.

the brass players seemed to play their parts more carefully than did the brass players in the first band. There was a better overall quality in the woodwind playing in the second band, and the second and third clarinet parts came through better. There was better balance between sections in the second band than in the first. The percussion section of the second band played with definite rhythmical feeling, and the entire group played with an exuberance absent in the first band. In my opinion, the second band which I heard was by far the better all-round band of the two.

Results of the Objective Tests

The results of the four interpolated objective tests are shown in Table II. These scores show a fairly consistent pattern. In all four tests the children taught by Method II made fewer errors than the children taught by Method I, and the difference widens over the four week period covered by the tests.

The difference between each child's score on Test IV and his score on Test I was calculated to determine his gain, and a mean difference for each group taken. A small sample or t test was applied to the two mean differences to determine whether the gain differences of the two groups reached or approached statistical significance. This analysis was applied first to total error scores of the groups, and then to each error category separately. Since the errors made in the two categories, "Sl" or articulation errors and "T" or tempo errors, were extremely few in both groups, it was not thought worthwhile to apply a statistical analysis

TABLE II

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

A. Test I: Familiar Examples: Children Taught by Method I

Child	W	R	H	B	Sl	T
1		2.00	1.00	2.33		
2	.66	1.66				
3		2.00				
4		1.33		.33		
5	.66	3.00				1.00
6	2.00	3.33	1.33	1.33		
7	.33			.66		
8		1.66	.33			
9	.33	1.66	2.00	.33		
10	.33	1.33		.33		
11		.66		5.00		
12		5.00	.33			
13		3.00				
14	3.33	3.33	1.00	1.00		
15		1.66	2.66	.33		
16	.33	1.00	.33	.66		
17	1.00	.66		3.66		
18	1.00	1.00	.33			1.00
19		2.33		.66		.33
20	.33	3.00	1.66	.66		1.33

B. Test I: Unfamiliar Examples: Children Taught by Method I

Child	W	R	H	B	Sl	T
1	.33	1.33	1.33	3.33		
2	1.00	.33		1.66		
3		3.00	.33	1.33		
4		.66	.33	.66		
5	.33	1.66		2.00		
6	2.00	4.00		2.00		
7	3.33	.66	.33	1.66		
8		1.66	1.00	2.33		
9	1.00	4.00	1.00	1.00		
10	.33	1.66	1.66	1.66		
11	1.00	.66	.33	4.66		
12		5.00				
13		.66				
14	5.33	2.66	.66	1.66		
15		2.00	1.66	1.00		
16	.66	.66	1.00	1.00		
17		2.00		2.66		
18	.33	1.33	1.66	2.00		
19		2.00		2.66		
20	.66	.33	3.00	3.00		

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

C. Test I: Familiar Examples: Children Taught by Method II

Child	W	R	H	B	S1	T
1	.66	.33		.66		
2		1.00		.66		1.00
3	1.33	4.00		.66		
4	.66	3.00		1.33		
5	.33		.33	.33	.33	
6		1.66		1.00		
7	2.33	.33	.66	.66		
8	.33	2.33		.66		
9	1.00	.33		1.00		
10	.66	.66				
11		.33		.33		
12		1.00		3.00		
13	.66	2.66		1.66		
14	.66	1.66		1.00	1.33	
15		4.00	.66	.66	.33	
16	1.00	1.00		.33	.33	
17		1.66		.66	.33	.33
18		3.00				
19		1.66	3.66			
20		.33	1.33			

D. Test I: Unfamiliar Examples: Children Taught by Method II

Child	W	R	H	B	S1	T
1		.33	1.00	.33		
2	3.00	1.00	.33	1.33		
3	2.33	2.33	.66	1.00		
4	1.00	3.33	1.00	2.66		
5		.66	.66	.33		
6		1.33	.66			
7	.66	2.00		3.00		
8	.66	1.66		1.33		
9	.33			.33		
10	.66	1.00		.33		
11	.33	.66				
12		3.00	.33	3.33		
13		2.66	.33	2.66		
14	1.00	.33		2.33		
15		.66	1.33	1.33		
16		.66	.33	1.33		
17	.33	1.00		1.66	1.66	
18		.66				
19		4.33				
20		6.00				

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

E. Test II: Familiar Examples: Children Taught by Method I

Child	W	R	H	B	S1	T
1	1.33	1.33	.66	2.00		
2	1.00	1.00		.33		
3		.66				
4	.66	.66		2.33		
5		3.00	.33	.66		
6	2.66	3.33	.33	2.33		
7			.33			
8	.33	1.66		1.00		
9	.33	1.66	1.33	1.66		
10	.66	2.66	.33	1.00		
11	.33			2.33		
12		2.33	2.66			
13		.66				
14	2.00	2.00	.66	1.33		
15		1.66		1.33		
16	1.33	1.66		.33	.66	
17		1.66	1.33			
18	.33	2.00	.33	1.33		
19		1.66		2.66		
20		.66		.66		

F. Test II: Unfamiliar Examples: Children Taught by Method I

Child	W	R	H	B	S1	T
1	1.00	2.66	3.00	1.66		
2	.33		.33	1.00		
3		1.00	.33			
4				.33		
5		2.33	.33	1.33		
6	8.33	2.33	.66			
7	1.33	.33	.33			
8	1.33	1.33	2.00	1.00		1.00
9	1.00	2.00	2.33	2.00		
10	.66	2.00	1.66			
11	1.66	.66		2.66		
12		2.33	2.33			
13		.66				.66
14	1.33	3.00	2.33	.33		2.00
15	.33	.33	1.00	1.00		
16	2.00	3.00	1.00	.66		
17	.66	2.66	.66	1.33		
18	.66	2.00	1.00	.66		
19		1.33		1.33	.66	1.00
20	1.00	1.00	1.00		.66	

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

G. Test II: Familiar Examples: Children Taught by Method II

Child	W	R	H	B	Sl	T
1	.33	1.33		1.33		.33
2	.33	2.33	.66	1.33		
3	1.66	2.66	1.00	3.00		
4	.33	1.00	.33	1.66		
5	.33		.66	.33		
6	.66	.66	.33	.33		
7		2.66	.66	1.66		
8	.33			2.33		
9	.66	.66		.33		
10		.33				
11		.66		.66		
12		3.00	.33	3.00		
13		3.66	.66	2.66		
14				.66		
15	.33		.66	.66	.66	
16						
17						
18		.33				
19		2.66	.33			
20		1.33				

H. Test II: Unfamiliar Examples: Children Taught by Method II

Child	W	R	H	B	Sl	T
1		.33	.33	1.66		
2		1.66	1.66	1.33		
3	1.33	5.33	.66	3.00		
4	1.66	2.66		.66	.33	
5			.33			
6	.33	.33	1.33	1.00		
7	1.33	1.66	1.66			
8				1.00		
9		.66				
10	.66	.66	.66			
11	.33	1.33	.66	.33		
12	.33	1.00	.66	2.33		
13	.33	2.66	.66	3.66	.33	
14				2.00		
15	1.33	.66		2.33		
16	1.33	1.33		.33		
17					2.00	
18		.66				
19		2.00	1.00			
20		1.00	1.00			

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

I. Test III: Familiar Examples: Children Taught by Method I

Child	W	R	H	B	Sl	T
1	1.33	.33	.33			
2		1.66		.33		
3	.33	1.00		.33		
4		3.33				
5	.66	1.66	.33	3.33		
6	4.00	5.00	.33	2.00		
7	2.00	.66	.66	.66		
8	1.00	1.33	.33	1.66		
9		3.00	.66	.66		
10		1.33		.33		
11	.33	1.66	.33	3.33		
12		2.66	2.00			
13						1.00
14	1.00	4.66	.66	1.66		
15	.33	2.00	1.33	.33		
16	.33	1.66				
17		2.00		1.00		1.00
18	.33	1.33	.33			.33
19		1.00		1.00	1.66	.33
20	1.00	2.66	.33		2.66	

J. Test III: Unfamiliar Examples: Children Taught by Method I

Child	W	R	H	B	Sl	T
1	.66	1.66	.66	1.00	.33	
2	1.66	1.00	.33			
3		1.00	1.00			
4	1.00	1.66		.33	.33	
5		2.66				
6	3.00	5.33	.33	.33		
7	1.00	3.33	.66			
8	.33	2.66	1.00	.66		
9	1.33	1.33	2.00	2.66		
10	.33	.66	2.00	.66		
11	2.66	.66		3.00		
12		3.00	3.00			
13		.33	.66			1.00
14	1.33	6.00	1.00	1.00		
15	.33	4.33	2.00			
16	1.33	3.33				
17	.33	3.00	.33	.33		
18	1.00	.66	.66	.33		
19	.33	1.66		1.33	.33	.66
20	2.00	2.00	2.00		.66	

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

K. Test III: Familiar Examples: Children Taught by Method II

Child	W	R	H	B	S1	T
1	.33	1.33	.33			
2				.33	.66	
3	2.00	3.00	1.00	1.00		
4	.33	3.00		.66		
5		1.33				
6	.66	.66	.33	.33		
7	.33	1.33	.33	.66		
8		1.33				
9	1.00	1.00		1.66		
10	.66	.33				
11		1.33		1.33		
12			.33	1.33		
13	.33	1.33	.66	2.00		
14	.66	1.00				.33
15			1.00			1.00
16	1.33			1.00		
17	.33	1.66		1.00	3.00	
18		1.66				
19		.33				
20		.66	.66			.33

L. Test III: Unfamiliar Examples: Children Taught by Method II

Child	W	R	H	B	S1	T
1		2.66	1.33	.66		
2		1.00	.33			
3	1.66	2.66	.33	.66		
4	.66	2.00				
5	.33	.66				
6	.66	.33				
7	.33	1.66		.33		
8						
9	1.66	2.00				
10		1.66	.66			
11	.66	.66	2.33			
12		.66	.33			
13	1.66	2.33		1.00		
14	1.66	1.00	1.33			
15		2.00	1.33			
16	1.33	.33				
17	.33	.33	.66		1.33	
18		.33				
19		1.00				
20		2.00	.33			

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

M. Test IV: Familiar Examples: Children Taught by Method I

Child	W	R	H	B	Sl	T
1	.33	1.00	.33	.33		
2	.33	1.33		.66		
3	.33	.66	1.00			.33
4	.33	2.33	.66	.33		1.00
5	.66	4.33	.66			
6	1.33	4.00	.33	.33		
7	.66	2.66	.66	3.00		
8						
9		3.00	1.33	1.33	.66	
10	.33	2.00	1.33	.33	.33	
11	.66	1.00	1.00	3.33		
12		3.33	1.33			
13		1.00				
14	.66	3.33	.66	1.66		
15	.33	3.33	1.00	1.66		
16	.66	2.33	2.00	1.00		
17		3.00				.33
18	.33	.66	.33	1.00		
19	.66	.33		1.00	.33	
20	1.00		.33		2.00	

N. Test IV: Unfamiliar Examples: Children Taught by Method I

Child	W	R	H	B	Sl	T
1	5.00	3.00	.66			
2	.66		1.66			
3	.66	1.33			1.33	
4	1.33	2.33	1.66		2.00	1.00
5	1.33	1.00	2.33	1.66	1.33	
6	6.33	3.33	.33	.66		
7	.66	1.00	.66	1.33	1.66	
8			.33			
9	2.00	2.00	2.66	.33		.33
10	.33	1.00	2.33	1.00	2.00	
11	2.00	1.33	.33	3.00	1.66	
12		3.33	.66			
13		1.33				
14	2.66	3.00	.66	1.00	1.66	
15	3.33	3.66	.33		.66	.33
16	4.66	3.33	1.33	1.33	.33	
17	1.66	3.00	1.33	.33	1.00	
18	3.66	1.00		1.00		
19		.66		1.66		
20	1.33	1.33	3.00		1.33	

TABLE II (continued)

INDIVIDUAL SCORES MADE ON OBJECTIVE TESTS

O. Test IV: Familiar Examples: Children Taught by Method II

Child	W	R	H	B	S1	T
1	.66		.66	.33		
2			.33			
3	4.00	3.33	.33	.33		
4	.66	2.33	.66			
5		1.66				
6	1.00	1.00	.66			
7	.33	2.00	.66	.33		.33
8	.33	.33			.66	
9			.33			
10	.33	.33				
11	.66	.33	.66			
12			.33	1.33		
13	.33	1.66		1.66		
14	2.00	1.00	.33	.33		
15		2.66	1.00			
16		.33				
17		.66				
18						
19		1.00				
20		.66				

P. Test IV: Unfamiliar Examples: Children Taught by Method II

Child	W	R	H	B	S1	T
1	2.66	1.00	1.33			
2	1.33					
3	4.00	1.33		.66		
4	2.66	1.33		1.33	1.66	1.00
5	.66	1.00	1.00			
6		.33	.33	.66		
7	1.33	.33	.33			
8	.33	2.00	.33	.33		
9	.33	.33				
10		.33	.33	1.00		
11	1.00	.33	.66	1.33		
12		.66	.33			
13	1.66	1.33	.33			
14	3.00	2.66	.33			
15						
16	.66	1.33		1.66		
17	.66	.66	1.33	1.66	1.33	.33
18		1.00				
19		1.00				
20		1.00				

to these categories separately, although they were included in computing total errors. The mean differences of scores made on the tests over familiar examples were found to be as follows:

	Method I	Method II
Total Errors	.05	1.23
"W" Errors	.11	-.04
"R" Errors	.00	.57
"H" Errors	-.10	.04
"B" Errors	.07	.57

The results of the t tests applied to determine the significance of these mean differences were as follows:

	t
Total Errors	1.76
"W" Errors	2.55
"R" Errors	1.30
"H" Errors	.70
"B" Errors	1.09

Of the values obtained for t, only two reached statistical significance, the t obtained for total errors, and the t obtained for "W" errors or errors in pitch. The figure 1.76 is significant at the .10 level of the distribution of t, at which a t of 1.725 is required for significance with twenty cases or scores. This means that in ninety out of a hundred repetitions of the study, the t obtained is too large to be attributable to chance. The t of 2.55 obtained for "W" errors is significant at a higher level in the t distribution, at the .05 level, which means that only in five out of a hundred times could so large a t be attributable to chance.

A t which is significant at the .05 level is usually required before "statistical proof" is said to have been established in educational studies. Two factors in the present study made it extremely unlikely from the beginning that such a ratio could be found: first, the smallness in size of the sample of children studied, and second, the short length of time over which the study was conducted. As was pointed out in an earlier chapter, the present study was not undertaken with the ambition to produce results from it that would statistically prove that one method was unquestionably superior to another. It was undertaken to find merely which of two methods of teaching produced the best results in classes of children equated as nearly as possible in an actual classroom situation.

The same statistical analysis described above was applied to the total error scores obtained in the tests over unfamiliar examples or sight-reading tests. This calculation yielded a t of 2.14 which is well above the 2.086 required at the .05 level to establish significance. However, the mean differences which were used in the calculation were -1.05 for the class taught by Method I and .83 for the class taught by Method II, which means that the children taught by Method I actually lost rather than gained in sight-reading proficiency, and those taught by Method II gained only .83 over the four

week period.

It will be remembered that in the last of the sight-reading tests, new material was introduced that was not taken from the regular class book to determine whether or not some pupils might have been familiar with the sight-reading material used previously, unknown to the teacher. The unusual scores obtained on the last sight-reading test indicate that some factor was present during this last test that was not present before. It is not possible to know exactly what this factor was. It may have been that some children had managed to become familiar with the "unfamiliar" material used in the first three tests; or it may have been that, in spite of the teacher's efforts in selection, the new material introduced was in some way too greatly different from that which had been used in class; or it may have been that some completely unsuspected factor was present.

At any rate, it is obvious that a mean difference used to calculate "gain" between Test I and Test IV such as was applied to the familiar example test scores is not applicable. Rather than discard the sight-reading scores altogether, it was decided that it would be better to apply a t test to the scores obtained on the last sight-reading test alone. While such a calculation would not indicate the comparative gain made by each class over the four weeks of the study, it would show the comparative

level of sight-reading proficiency of the two groups at the end of the study. In reading the following results of this calculation, it should be borne in mind that the means mentioned are the means of the raw scores obtained in Test IV, rather than mean differences indicating mean gain from Test I to Test IV. The means obtained were as follows:

	Method I	Method II
Total Errors	6.39	2.89
"W" Errors	2.08	1.19
"R" Errors	1.85	.90
"H" Errors	1.01	.33
"B" Errors	.74	.51

Inasmuch as the above figures represent the average of errors for each group, it will be seen that the children taught by Method II, having made fewer average errors in all categories, performed better on this test than the children taught by Method I. In the figures given for the mean differences in the tests over familiar examples, the mean differences represented gain, and therefore in those figures, the higher the mean, or average gain, the better the performance.

The following results were obtained from the t test applied to the means obtained in the last sight-reading test:

	t
Total Errors	4.49
"W" Errors	1.71
"R" Errors	3.39
"H" Errors	2.83
"B" Errors	.96

Of these values, the t obtained for total errors is statistically significant at the .001 level; the t obtained for "R" errors is significant at the .01 level; the t obtained for "H" is significant at the .02 level, missing by .01 being significant at the .01 level; the t obtained for "W" errors is within .015 of being significant at the .10 level; the t obtained for "B" errors does not approach significance at any level in the t distribution.

One further point requires discussion. It will be seen that in the figures given for the tests over familiar examples, the children taught by Method I show a significant superiority in gain over the children taught by Method II in the "W" error category, or errors in pitch. This is the one exception in an otherwise consistent pattern. In the first three tests, the mean score of the class taught by Method II in the "W" error column is consistently smaller, showing fewer errors, than that of the class taught by Method I. What is the reason, then, for the sudden change in Test IV?

Examination of the differences between individual scores from Test I to Test IV shows that there were only four cases in which there was a loss, or minus score, in the class taught by Method II. These four losses are, however, unusually high. In the same class there are seven whose difference was zero, indicating that they made the same number of errors in pitch in Test I as in

Test IV. This accounts for the loss in the group average. In the class taught by Method I, there were nine (over half) cases of losses from Test I to Test IV, but all these losses were small. Also there were only two who made a gain of zero. Thus, although over half of the children taught by Method I made a loss in errors in pitch from Test I to Test IV and only four of the children taught by Method II made losses, the average scores for the children taught by Method I were still better than those of the children taught by Method II. While this shows that the cause for the sudden retrogression of scores of the class taught by Method II was due in large part to the large number of errors made by only four children, it is still impossible to account for the unusual performance of these four. However, in the opinion of the writer, these scores were not typical of the usual performance of the group taught by Method II, as judged from the preceding three tests.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary of the Study

A survey of available literature and reviews of literature revealed to the writer that little has been written concerning the application of learning psychology to classroom teaching in the field of instrumental music. Of the writings on the subject reviewed by the writer, the practice was always to apply learning principles formulated in the psychological laboratory to theoretical teaching situations, rather than to report actual research in classroom situations. The present study was an attempt to test two hypotheses of the nature of learning in actual practice.

It was the purpose of the writer to go into two classes, teaching each class by a different teaching method, and comparing the achievement of the two classes at intervals during the study and at the end of the study.

The two hypotheses, each derived from a learning theory currently accepted by many psychologists, may be respectively described as follows:

1) Learning is mechanical in nature, consisting

primarily of habit formation induced by repetition of a response by the organism to a specific external stimulus, the proper response being associated with satisfaction or reduction of a specific need in the organism. Reasoning and understanding are secondary byproducts of the learning situation.

2) Learning is understanding. It takes place when an organism effects a new psychological organization of its environment, enabling it to see relations of elements in the environment to each other and to itself. This cognitive process empowers the organism to react to its environment in terms of desirable goals or end results. Once the cycle just described is complete, learning has taken place. Repetitions of the response will not increase learning.

The two classes were composed of twenty children per class enrolled in the Boulder Summer Recreational Music Program. They ranged in age from nine through eleven, and in playing experience from less than a year through three years. They were all of the same general playing ability level as determined by the director of the summer program.

The two classes each were composed of the same numbers in instrumentation except in cases where an odd number of children made it necessary to place one more player of a particular instrument in one class than in the

other. The groups were equated on the basis of intelligence, general academic achievement, reading ability, school music achievement, and general musical background. Sources of information concerning these factors included cumulative records from the Boulder Public Schools; discussions with teachers, principals, and parents; questionnaires completed by the children; and auditions and private conversations with the children themselves.

Equation of the groups was not done by attempting to pair individaul children for comparison, but by placing an approximately equal number of children of all ages, musical backgrounds, and ability levels in both groups.

Each of the two classes met in the same classroom for an hour each day four days a week, the fifth day being devoted to testing. Both classes used the same published materials for subject matter: one book of unison musical exercises and one book of non-unison musical pieces for band.

Briefly described, the two teaching methods or procedures were as follows:

Method I: The teacher gave specific directions at all times. The objective was to stamp in good habits and stamp out bad ones. When a correct response was made, reward or need reduction was administered in the form of verbal compliment by the teacher. The response was established as a habit by repetition. No attempt was

made to help the children to understand reasons for any activity.

Method II: The attention of the children was directed toward unsolved problems in their playing. They were given the responsibility of solving the problems with no specific directions from the teacher. The teacher made suggestions of areas and methods of experimentation, but no hint as to the correct solution. The solution had to be discovered by the children themselves, individually or by concensus of group opinion. The teacher never verified the decisions of the children for them. All decisions were made by the children, and the responsibility for drawing conclusions was placed on the children.

Results of the study were determined by two independent programs of measurement:

1) Subjective observation. This program was carried on daily through observation of group performance by the teacher. Classification of areas for evaluation were drawn from criteria in general use among music educators in contest and festival activities. Areas chosen were Tone, Intonation, Interpretation, Technique, and General Effect.

Daily observations were recorded in two diaries, one for each class. An adjudicator independent of the study who had an extensive background of judging experience judged each child's performance and the ensemble performance

of each class at the end of the study.

2) Objective measurement. The objective measurement program was carried on through four interpolated tests, a test being given at the end of each of the four weeks of the study. Scores were given in terms of specific errors checked against each child's performance by the tester. Errors identified for the tests, derived from John G. Watkins' Objective Measurement of Instrumental Performance were as follows: incorrect notes, incorrect note or rest lengths, incorrect pauses or hesitations, incorrect slurrings or tonguings, and incorrect tempo. Each child was tested each week over one prepared example and one unfamiliar example. Three trials were allowed each child on each example, and an average of the errors made during the three trials was scored against him.

Results of the subjective observation program reveal that the children taught by Method I made a noticeable advance during the first week in playing together with precision while the children taught by Method II made little or none. During the second week, however, the children taught by Method II began to show improvement which increased rapidly through the remainder of the study. At the end of the study, the children taught by Method II were considered to have made greater progress in all areas than the children taught by Method I. The greatest superiority of the

class taught by Method II was noticed in the areas of tone quality, intonation, balance, and blend. Also noticeable were more co-operative general attitudes and fewer discipline problems in the class taught by Method II. The opinions of the teacher concerning the relative performance level of the two classes were corroborated by the ratings given the individual children and the two classes by the adjudicator, who had no previous knowledge of the nature of the study.

The results of the objective tests revealed that the children taught by Method II made better scores in all areas than the children taught by Method I, the difference between the classes widening as the study went forward. An exception to the foregoing statement occurred in the area of errors in pitch made on the last test, in which, contrary to the pattern formed on the preceding three tests, the children taught by Method I made fewer errors than the children taught by Method II.

Statistical analysis revealed that the difference in gain from Test I to Test IV between the classes approached accepted statistical significance in total errors scored on the tests over prepared examples. Analysis of the difference between the classes of the scores made on the fourth sight-reading test revealed that the difference was significant in all areas except errors in breathing.

Conclusions and Recommendations

All of the results compiled in the measurement and evaluation program are consistent in indicating that the performance of the children taught by Method II was, at the end of the investigation, superior to the performance of the children taught by Method I. Moreover, the records tell us that the gain in excellence of performance over the four week period was greater for the children taught by Method II than for those in the other class. Inferring learning from observed performance, then, we may say that the children taught by Method II learned with greater efficiency the material studied in class than those taught by Method I.

The question vital to the drawing of conclusions from these results remains to be considered: Was the greater efficiency in learning among the children taught by Method II attributable chiefly to the fact that they were taught by that method, or were other factors more largely responsible for the difference? Let us examine other possible factors that might have caused the differences in observed performance.

The first factor which the writer would present as a possible alternative explanation for the differences in performance between the classes is the factor of sampling. Is it possible that the performance differences were

largely caused by the fact that the children taught by Method II were equipped with greater learning capacity than the children taught by Method I, to begin with? The problem of equating the two classes in the present study was not as simple as it would have been for classes in subjects other than musical performance. It was not possible to use scores on an ability or achievement test as the basis for equating the classes by means of paired scores. However, the two classes were equated on the basis of general ability levels and personal background, an approximately equal number of children of all ability levels and backgrounds being placed in each group. In the absence of an aptitude or achievement test of musical ability with demonstrated validity, no other means of equating the groups than the one adopted was apparent to the writer. Since equation was not possible by means of objectively paired scores, extreme care was exercised in determining the composition of the groups on the basis of all collected information. No child was assigned to either group before any doubts as to his past achievements in school, particularly in music classes, and his personal background had been removed by further investigation. In the opinion of the writer, the precautions taken in collecting information and in assigning children to one group or the other were sufficient to warrant the assumption that the two classes were approximately equal

in general ability and in backgrounds of the children, and that any differences in the two groups at the beginning of the study were negligible as far as being causal to observable performance differences is concerned. This assumption will be implicit in the conclusions stated hereafter.

The second factor which might be thought to have contributed significantly to the findings in the study is the factor of chance. Might the observed differences between the two classes be due to uncontrolled chance factors present in the learning or testing situations? No objectively determined answer is possible, of course, concerning the differences observed and recorded in the subjective evaluations of the groups. Here, the writer can only offer his opinion, subjectively arrived at and therefore subject to challenge, that the differences were too great to have been caused by chance factors.

Concerning the objective test scores, however, more objective discussion is possible. The statistical analysis of the differences in gain in terms of total errors tells us that ninety times out of a hundred these differences would not be attributable to chance. Another point deserves mention here. It will be remembered that the two groups were not determined by random selection, but were equated according to definite principles. They are therefore not random with respect to each other, but are

related groups. Because paired individual scores were not possible in equating the groups, it was also not possible to apply the t test normally used to test differences between matched groups. The t test used was necessarily the one for uncorrelated means. Had it been possible to apply a test of significance to the means which would have taken into account the non-random relation of the groups to each other, larger values obtained for t could have been expected. While the significance level of the gain differences in the tests over familiar material did not reach the arbitrary figure required for statistical demonstration of significance (ninety-five times out of a hundred, or the .05 probability level), their indications may still be important to the music educator, who is more interested in discovering successful teaching methods than arbitrarily assigned levels of statistical significance. This is particularly true in evaluating the results of the present study, in which there were two inherent factors which made statistically significant differences unlikely from the beginning: the smallness of the available sample, and the shortness of the available time for the study.

In the light of the factors just discussed, the writer does not believe that the results of the study should be considered negative where they fell short, by a small margin, of the statistical significance usually

required in educational and psychological experiments. Rather, he would prefer to think of them as indications of probability. He would also remind the reader that those scores which failed to reach statistical significance in difference represented gain from Test I to Test IV. Had the statistical analysis been applied to only the scores on the last test, the results would almost certainly have been well above the .05 significance level, as were the results of the t test applied to the last sight-reading tests.

As was stated in an earlier chapter, the outcome of the study was not intended to be offered as "scientific proof" of any learning theory. Of the results of the investigation the writer would conclude:

1) They do not support the mechanistic theories of learning.

2) They do not contradict the field psychology theories of learning.

In qualification, the writer would add that there remains the possibility that a mechanistic type of learning took place, the laws of which are not presently accounted for in any of the major theories.

From the observed comparative progress of the two groups, the writer would draw the following conclusion: There are indications that the cognitive process of understanding plays a very important role in learning, both from the standpoint of efficiency in original learning and

from the standpoint of greater and longer retention. This is particularly noticeable in those areas that involve musical judgment e.g., tone production, intonation, interpretation, balance, and blend.

Building on these conclusions, the writer would offer the following recommendations for teaching instrumental music classes in the schools:

1) The greater emphasis should be placed on allowing children to discover things for themselves; less emphasis should be placed on directions given by the teacher.

2) A large part of the responsibility for playing musically should be placed on the players. In terms of overall performance, this will yield greater returns than consistent imposition of the teacher's ideas on the players.

Finally, other studies are needed which are specifically designed to test the relative effectiveness of different teaching procedures. Further investigation is needed to verify or refute the conclusions made on the basis of the present study. In a repetition of the present study, the writer would recommend the following improvements in the design of the investigation:

1) A longer period of time, ideally a complete academic year, should be available for the study.

2) More limited areas of investigation would make

possible greater refinement of the experimental apparatus and techniques of measurement.

3) Improved methods of observation and measurement should be employed. Objectivity in observation would be increased by defining and organizing areas of observation more closely, using a predetermined rating scale. More than one observer, besides the teacher, recording their observations independently of one another would also increase objectivity of observation. Objectivity in scoring the objective tests would be increased by making recordings of each child's playing and having the errors scored from the recordings by more than one grader.

4) Selection of subjects would be made more accurate if a reliable test were available for determining the ability level of each child before the classes were grouped. The test should be tested for validity and reliability by administering it to a great number of children to establish norms before using it as a pre-test in the investigation.

5) Class activities should be determined entirely by the requirements of the experimental design without superimposition of outside factors, such as preparation for a public performance.

As all research scientists are aware, ideal conditions in investigation are rarely if ever achieved.

Ideal conditions must always be approximated as nearly as possible, for as the ideal experimental situation is approached, the accuracy of predictions increases directly. However, teachers need not and should not wait for ideal experimental conditions before undertaking research projects designed to aid in the formulation and verification of general principles of teaching which are successful in actual classroom learning situations. It is the hope of the writer that the present investigation will prove to have contributed to that objective.

BIBLIOGRAPHY

BIBLIOGRAPHY

A. BOOKS

Boring, Edwin G., A History of Experimental Psychology. New York: Appleton-Century-Crofts, Inc., 1950. 745pp.

Darrell, R. D., compiler, Schirmer's Guide to Books on Music and Musicians. New York: G. Schirmer, Inc., 1951. 400 pp.

Deese, James Earle, The Psychology of Learning. New York: McGraw-Hill Book Company, Inc., 1952. 398 pp.

Edwards, Allen L., Experimental Design in Psychological Research. New York: Rinehart and Company, Inc., 1950. 358 pp.

Garrett, Henry E., Statistics in Psychology and Education. New York: Longmans, Green and Co., 1938. 463 pp.

Glenn, Neal E., Teaching Music in Our Schools. Dubuque, Iowa: Wm. C. Brown Company, 1951. 129 pp.

Guthrie, E. R., The Psychology of Learning. New York: Harper and Brothers, 1952. 297 pp.

Hilgard, Ernest R., Theories of Learning. New York: Appleton-Century-Crofts, Inc., 1948. 361 pp.

Hilgard, Ernest R. and Donald G. Marquis, Conditioning and Learning. New York: Appleton-Century Company, 1940. 429 pp.

Hull, Clark L. and C. Hovland, R. Ross, M. Hall, D. Perkins, and F. Fitch, Mathematico-Deductive Theory of Rote Learning. New Haven, Connecticut: Yale University Press, 1940. 329 pp.

James, William, Principles of Psychology. New York: Henry Holt & Co., 1890. 468 pp.

Jones, Llewellyn Bruce, Building the Instrumental Music Department. New York: Carl Fischer, 1949. 143 pp.

Kingsley, Howard L., The Nature and Condition of Learning. New York: Prentice-Hall, Inc., 1946. 579 pp.

Koehler, Wolfgang, The Mentality of Apes (tr. E. Winter). New York: Harcourt, Brace, and Co., 1925. 342 pp.

Koehler, Wolfgang, Gestalt Psychology. New York: Horace Liveright, 1929. 394 pp.

Koffka, Kurt, The Growth of the Mind. London: Kegan, Paul, Trench, Trubner, and Co., Ltd., 1924. 383 pp.

Lindquist, E. F., Design and Analysis of Experiments in Psychology and Education. Boston: Houghton, Mifflin Co., 1953. 382 pp.

McNemar, Quinn, Psychological Statistics. New York: J. Wiley, 1949. 364 pp.

Miller, Neal Edgar and John Dollard, Social Learning and Imitation. New Haven, Connecticut: Yale University Press, 1941. 341 pp.

Mursell, James L., Education for Musical Growth. Boston: Ginn and Company, 1948. 340 pp.

_____, Educational Psychology. New York: W. W. Norton and Company, Inc., 1939. 318 pp.

_____, Music and the Classroom Teacher. New York: Silver, Burdett Company, 1951. 280 pp.

_____ and Mabelle Glenn, The Psychology of School Music Teaching. New York: Silver, Burdett and Company, 1936. 371 pp.

Seashore, Carl E., The Psychology of Music. New York: McGraw-Hill Book Company, Inc., 1938. 408 pp.

Stolurow, Lawrence M., editor, Readings in Learning. New York: Prentice-Hall, Inc., 1953. 499 pp.

Thorndike, Edward Lee, Animal Intelligence. New York: The MacMillan Company, 1911. 297 pp.

Van Bodegraven, Paul and Harry R. Wilson, The School Music Conductor. Chicago: Hall and McCreary Company, 1942. 148 pp.

Watkins, John Goodrich, Objective Measurement of Instrumental Performance. New York: Teachers College, Columbia University, 1942. 88 pp.

F. MISCELLANEOUS

California Test of Mental Maturity, short form. Los Angeles, California: California Testing Bureau.

Co-operative English Test. New York: American Council on Education.

Solo and Ensemble Adjudicator's Comment Sheet. Chicago: National School Band, Orchestra, and Vocal Association, 1941. 1 p.

APPENDICES

APPENDIX A

PRELIMINARY SURVEY: A SELECTED REPRESENTATIVE LIST

A. BOOKS

Allen, J. Worth, The Orchestra Director's Manual. New York: Carl Fischer, n. d. 59 pp.

Carr, Raymond Norman, Building the School Orchestra. Elkhart, Indiana: C. G. Conn and Co., 1923. 111 pp.

Davis, Ennis, More Than a Pitchpipe. Boston: C. C. Birchard and Company, 1941. 169 pp.

Dykema, Peter W. and K. W. Gehrkens, The Teaching and Administration of High School Music. Boston: C. C. Birchard and Company, 1939. 382 pp.

Glenn, Neal E., Teaching Music in Our Schools. Dubuque, Iowa: Wm. C. Brown Company, 1951. 129 pp.

Hindsley, Mark H., School Band and Orchestra Administration. New York: Boosey & Hawkes, Ltd., 1940. 107 pp.

Jones, Llewellyn Bruce, Building the Instrumental Music Department. New York: Carl Fischer, 1949. 143 pp.

Mursell, James L., Education for Musical Growth. Boston: Ginn and Company, 1948. 340 pp.

_____, Music and the Classroom Teacher. New York: Silver, Burdett Company, 1951. 280 pp.

_____ and Mabelle Glenn, The Psychology of School Music Teaching. New York: Silver, Burdett Company, 1936. 371 pp.

Normann, Theodore F., Instrumental Music in the Public Schools. Boston: Oliver Ditson Company, 1941. 349 pp.

Prescott, G. R. and L. W. Chidester, Getting Results with School Bands. New York: Carl Fischer, 1947. 273 pp.

Seashore, Carl E., The Psychology of Music. New York: McGraw-Hill Book Company, Inc., 1938. 408 pp.

Van Bodegraven, Paul and Harry R. Wilson, The School Music Conductor. Chicago: Hall and McCreary Company, 1942. 148 pp.

APPENDIX A (continued)

PRELIMINARY SURVEY: A SELECTED REPRESENTATIVE LIST

B. PERIODICALS

Buttelman, C. V., editor, Music Educators Journal. Chicago: Music Educators National Conference, 1941-1953. Vols. 28-39.

Carr, Raymond, editor, The Instrumentalist. Glen Ellyn, Illinois: The Association for the Advancement of Instrumental Music, 1946-1953. Vols. 1-7.

Cookson, Frank B., editor, Educational Music Magazine. Chicago: Educational Music Bureau, Inc., 1938-1953. Vols. 18-32.

Davis, Ennis and Jean Tanner, editors, Music Publishers Journal. New York: Music Publishers Journal Co., 1945-1953. Vols. 3-11.

Shepherd, Robert L., editor, The School Musician. Chicago: School Musician Publishing Co., 1943-1953. Vols. 15-24.

C. PUBLICATIONS OF LEARNED ORGANIZATIONS

Journal of Proceedings of the Music Supervisors' National Conference. Ithaca, New York: the Conference, 1914-1930.

Papers and Proceedings of the Music Teachers National Association. Ann Arbor, Michigan: Music Teachers National Association, 1906-1950. Series 1-44.

Yearbook of the Music Educators National Conference. Chicago: Music Educators National Conference, 1935-1940.

APPENDIX B

LETTERS OF PERMISSION

Boulder, Colorado
June 10, 1953

To whom it may concern:

This statement will convey permission for John D. Dennis to conduct within the 1953 Summer Recreational Music Program of Boulder a teaching project in connection with his master's degree thesis at the University of Colorado.

I have read Mr. Dennis's written preview describing the proposed project, and I approve the objectives and methods of the project.

It is understood by Mr. Dennis that permission for the project is granted only on the following conditions:
1) that the proposed project shall not interfere in any way with the regular activities of the summer program;
2) that any personal information concerning any children or their progress in the summer classes included in the written report of the project shall be made in such a way that the individual identities of all the children will be kept confidential.

Permission is also given for John E. Stowe, a regular staff member of the summer program, to serve as assistant to Mr. Dennis in the proposed project when Mr. Stowe is not otherwise occupied with his regular work in the program.

(signed) L. Randall Spicer

L. Randall Spicer
Director of Summer
Recreational Music
Program

APPENDIX B (continued)

LETTERS OF PERMISSION

Boulder Public Schools
Box 186
Boulder, Colorado

June 15, 1953

This will convey permission for Mr. John Dennis to have access to the permanent records of Boulder students in connection with his master's degree work.

It is understood by Mr. Dennis that data in said records is to be kept completely confidential.

(signed) Natt B. Burbank

Superintendent

APPENDIX C

PERSONAL INFORMATION QUESTIONNAIRE

Intermediate Band

NAME_____ SCHOOL_____ GRADE_____

1. How many years have you played your instrument?_____

2. How old were you on your last birthday?_____

3. Have you taken private lessons on your instrument?
   Yes No

4. Did you take lessons on your instrument last semester?
   Yes No

5. Are you taking private lessons on your instrument now?
   Yes No

6. Have you taken private lessons on the piano? Yes No

7. Are you taking lessons on the piano now? Yes No

8. Do either of your parents play a musical instrument?
   Yes No

9. Did you attend any concerts during the last school year? Yes No How many?_____ What were they?_____

   _____

10. How much do you practice your instrument at home every day?_____ How much every week?_____

11. What are your two favorite subjects in school?_____ and_____

12. Name the two activities you like to do best outside of school. _____

13. List any hobbies you have. _____

    _____

14. Write the names of your two favorite pieces of music.

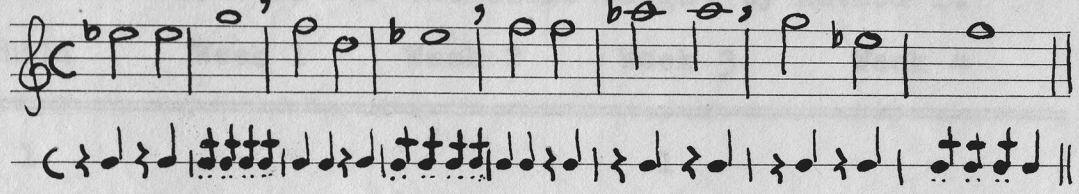
    _____

    _____

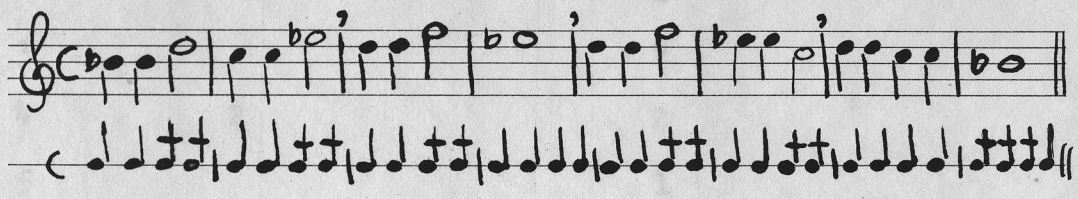
APPENDIX D

EXAMPLES USED IN THE OBJECTIVE TESTS

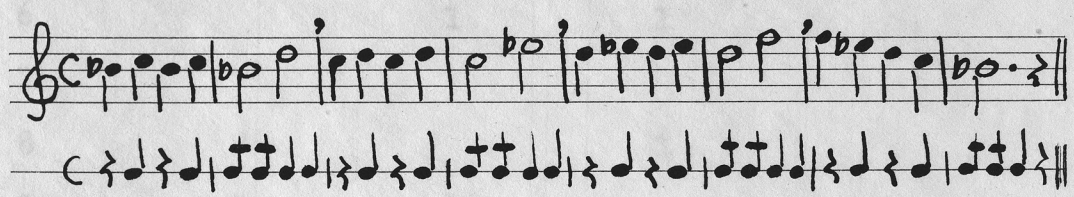
A.



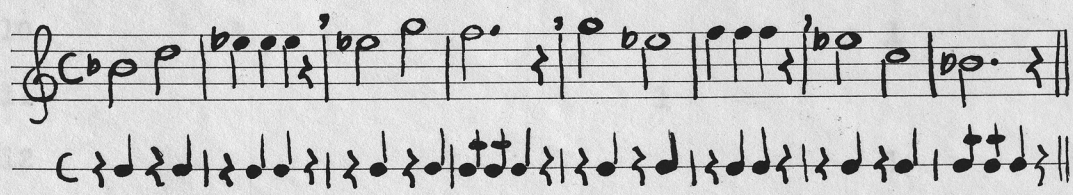
B.



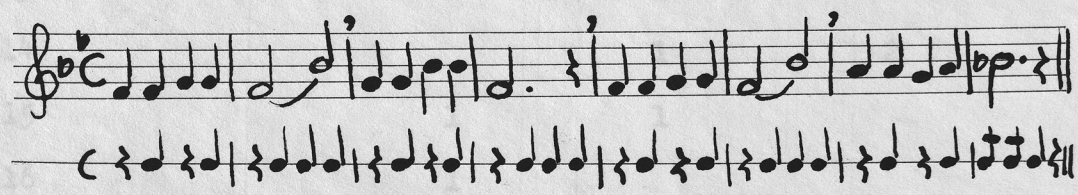
C.



D.



E.



The line below each stave represents the snare drum part.

APPENDIX E

ATTENDANCE RECORDS

I. Absences recorded for the class taught by Method I.

Child	Week 1	Week 2	Week 3	Week 4
1			1	
2			1	
3			2	
4	2		2	
5			1	
6		1	1	
7				
8	2		1	
9	1	1		1
10	1			1
11			1	
12		1		1
13			1	
14			1	2
15		1	1	
16		1		
17			1	
18			1	1
19			1	1
20		1	1	

APPENDIX E (continued)

ATTENDANCE RECORDS

II. Absences recorded for the children taught by Method II.

Child	Week 1	Week 2	Week 3	Week 4
1				1
2				1
3				
4	2			
5		1		1
6			2	2
7	1			2
8	1			1
9	1	1		1
10	1	1		1
11				1
12			2	2
13				1
14	2		1	
15	1			
16			2	
17		1	1	
18		1		
19		1		1
20	1		1	

APPENDIX F

EXCERPTS FROM THE DIARIES KEPT FOR THE TWO CLASSES

June 22, 1953

Ten o'clock class (Method I)

Attitudes of children. General attitude of most of the children is good. High spirits cause a few discipline problems. The children seem anxious, however, to please the teacher.

Attention of children. Attention of most children is given completely to class activities when they are themselves busy with the activities. When the teacher works with individuals or one instrumental section, however, the other children show signs of restlessness.

Emotional demonstrations. None.

Class Procedure. Class was begun late due to short delay in bringing music racks upstairs from the band room. Tuning was done first. A child in the clarinet section sounded his c'', and each child tuned his instrument individually to the sounded tone, the teacher verbally correcting each tone as it was played. Approximately fifteen minutes was occupied in tuning all instruments.

Exercise No. 35 in Book 2 (Belwin Elementary Band Method) was played by the class, attention being directed by the teacher to correctness of notes and to note and rest values only, at first. Errors were corrected verbally by the teacher. Individual players having noticeable difficulty played the exercise alone, and were given directions for improvement by the teacher. Then sections played alone, receiving corrective directions from the teacher in turn: cornet section, saxophone section, drums. Then the entire class played again. When a correct response was observed by the teacher, verbal commendation was given to the player or players by the teacher. After work with individuals and sections, the teacher noticed a definite improvement in precision of attacks and releases and group playing of note and rest values. When a performance satisfactory to the teacher was given, the class was asked to repeat the performance exactly the same way several times, the teacher expressing approval following each correct performance.

Class was dismissed at approximately 10:55 a.m.

APPENDIX F (continued)

EXCERPTS FROM THE DIARIES KEPT FOR THE TWO CLASSES

June 22, 1953

Eleven o'clock class (Method II)

Attitudes of children. The children appear to enjoy participating in class activities. They seem, for the most part, to be eager to please the teacher. Shyness is apparent in many, when asked questions by the teacher.

Attention of children. Most of the children are usually quiet, and give attention to class activities. After short periods of inactivity, they seem to grow restless, however.

Emotional demonstrations. None.

Class procedure. Class was begun late because several children did not know for sure where they were supposed to go. Children were asked to turn to Exercise No. 35 in Book 2. The class played the exercise, having been asked to listen closely for mistakes as they were playing. Criticisms of the performance were asked for by the teacher, but the children were reticent. The teacher asked the children to think about it while he worked with individuals.

A clarinet player was asked to play the first note of the exercise, holding it out, so everyone might listen to it. Each player in turn played the same note, and was asked by the teacher if his note sounded the same as the first players, and if not, what the difference was. Each child was asked to experiment with his tuning mechanism, adjusting it until he was satisfied with his pitch. Most children seemed unsure of themselves and did not appear to perceive differences in pitch. They seemed to guess at their accuracy and were puzzled when the teacher would not tell them whether they were correct or not. The tuning occupied approximately twenty-five minutes.

The exercise was played again, and the teacher asked for criticism from the group. When a criticism was offered, the class was asked to vote on it. Many children seemed uncertain in voting, waiting to see how others voted before venturing their own opinions. Little improvement was observed by the teacher between the first time and the last time that the exercise was played, except that fewer incorrect notes were played the last time.

APPENDIX F (continued)

EXCERPTS FROM THE DIARIES KEPT FOR THE TWO CLASSES

The class was dismissed at 11:55 a.m.

July 9, 1953

Ten o'clock class

Attitudes of children. Most of the children seem to enjoy playing, but show signs of boredom and irritation when asked to sit quietly while the teacher works with individuals or sections. Some children show a tendency to play at their own discretion without regard for class activities or teacher's directions. Several children express annoyance when asked to repeat an exercise several times.

Attention of children. Attention of children is difficult to get in order to begin class. Attention span of most children seems limited to the time they are actually playing and the time during which the teacher is specifically addressing them individually.

Emotional demonstrations. None.

Class procedure. Five minutes were occupied in checking roll and distributing a printed announcement for the children to take to their parents. Each clarinet player was asked in turn to play a slur from B-flat to C-natural. All clarinet players were directed to finger the notes as each individual played them. The teacher demonstrated the correct fingering on a borrowed clarinet. The section then was drilled on the two note slur, by being directed to play it many times in unison.

Ten minutes were taken for tuning, the procedure being the usual one: each player played in turn, the teacher making corrections as necessary.

Exercises No. 67 and 68 were played from Book 2. Each exercise was repeated several times, the teacher explaining the cornet fingerings between trials. Once a correct performance was given, it was difficult for the teacher to elicit as good a performance from the players a second and third time. No advance in tone quality was apparent, and precision of attacks and especially releases was not as good as it has been on several occasions.

The class was dismissed at 10:57 a.m.

APPENDIX F (continued)

EXCERPTS FROM THE DIARIES KEPT FOR THE TWO CLASSES

July 9, 1953

Eleven o'clock class

Attitudes of children. Most of the children seem eager to do well, and exhibit signs of disappointment when mistakes are made.

Attention of children. The attention of the class is generally good, with few interruptions. Children give attention when others are being worked with by the teacher.

Emotional demonstrations. None.

Class procedure. After checking the roll, the teacher began the class period with the playing of Exercise No. 64 in Book 2. Criticisms were immediately offered by several children who did not wait to be asked. The teacher asked the children to wait their turns and called for criticisms one at a time. As each criticism was offered, it was open for discussion, after which a vote was called for. Then the exercise was played again, and the performance voted on. When the performance was satisfactory to the group as shown by the vote, the next exercise was taken. Exercises No. 65, 66, and 67 were practiced, using the same procedure.

The clarinet players were asked to play a slur from B-flat to C. After they had tried it several times, they were told by the teacher that there was an easier way to play the slur. He asked them to see if they could discover it by class time the next day.

Exercise No. 67 in Book 2 was played again, the teacher suggesting that the children try to remember all the mistakes and criticisms, after which class was dismissed at 12:00 noon.

July 16, 1953

Ten o'clock class

Attitudes of children. Most of the class seem to enjoy playing, but dislike having to stop for corrections and directions from the teacher. Some are resentful when they are asked to play a part other than the melody.

APPENDIX F (continued)

EXCERPTS FROM THE DIARIES KEPT FOR THE TWO CLASSES

Attention of children. The teacher has increasing difficulty getting and holding the interest of some children. Many of the children are very restless toward the end of the class period.

Emotional demonstrations. None.

Class procedure. After the roll checking, tuning was done in the usual way, the teacher correcting each player's pitch individually. This occupied about ten minutes.

The remainder of the period was spent working on No. 13 in Book 1 (Fun for All). The trumpets were asked to play the melody in unison, corrections in fingerings being made by the teacher as wrong notes occurred. Then the entire class played, the teacher first warning the players of accompaniment parts to play very softly. The piece was repeated several times, the teacher giving directions for improving balance between trials. The teacher had some difficulty in working with sections due to disturbances by children in other sections than the one being rehearsed.

The class was dismissed at 10:55 a.m.

July 16, 1953

Eleven o'clock class

Attitudes of children. Most of the class appear eager to improve their playing. Some children grow restless toward the end of the period. There seems to be a general interest in whatever problems are being considered in class.

Attention of children. Attention is very good. Although the children feel free to talk when they are not playing, they give attention when asked to do so, and usually watch with interest whatever activity in class is being undertaken.

Emotional demonstrations. None.

Class procedure. Roll was checked, and instructions given for the "try-outs" to be given the next day. No. 13 in Book 1 was played. All sections played their parts individually while the rest of the class listened. Then a

APPENDIX F (continued)

EXCERPTS FROM THE DIARIES KEPT FOR THE TWO CLASSES

vote was taken to determine which part was most important and which parts were secondary. The melody was voted the most important part by a majority of fourteen to six. suggestions were then asked for by the teacher for the best way to play the piece so that the important part would be important in the sound of the band. Suggestions were made concerning balance between melody and other parts. Several children volunteered or were asked to come and sit in front of the class while the class played and then offer suggestions for improvement. Afterward, the suggestions were put to a vote.

The entire group played through Exercise No. 83 in Book 2 twice, no suggestions or criticisms being made, after which class was dismissed at 11:54 a.m.